ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO

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THE

DENTAL REVIEW.

1860.

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CONTENTS OF VOLUME THE SECOND.

EDITORIAL ARTICLES.

PAGE
Our Science at Home 1
The College of Dentists . . . 53
The Title "Surgeon-Dentist" . . 57
College of Surgeons' Certificate . . 107
Postscript 112
Quid pro Quo 155
Passing Events 203
Mr Cartwright's Address . . . 251
Professional Organization in France . 311
Anæsthesia in Dental Surgery . . 359
Medicine and Dentistry; their Relationships and Distinctions . . 407
The Shadow and the Substance . . 455
The College of Dentists and the Opening Session 503
Dr Chapin Harris 553
Retrospective 556

DENTAL SURGERY AND MECHANICS.

On Metals used in producing Metal Models. By W. Perkins, M.C.D.E. 9, 114
Immobility of the Maxillary Bones . 60
Superheated Steam. By Mr G. H. Jordan 120
Dental Cream 122
Nodular Calcification of the Dentinal Pulp. By J. Foster Flagg, D.D.S. 207, 256
Cancer of the Face or Lip—Cancer of Tongue—Danger of Bad Teeth. Mr Erichsen 212
Fibro-gelatinous Tumour of the Upper Jaw—Mr Fergusson 213
Ash's Vulcanite for Artificial Gums . 264
A Rare Form of Fracture of the Lower Jaw, involving both Neck and Body, treated by a Novel Method. By E. J. Fountain, A.M., M.D. . . . 266
Description and Application of a New Flask for the Manufacture of the Vulcanite Base 315
On a Case of Fracture of the Superior Maxilla and its Treatment. By James Salter, M.B., F.L.S. . . . 318
Cystic Growth of the Lower Jaw. By Edward Hutton, M.D., F.R.C.P.S. . 321
A New Base for Artificial Teeth . . 363
Improvements in Dental Instruments . 365
Facial Neuralgia. By F. H. Thomson, M.D. and L.F.P.S., Glasgow . . 366
New Method of producing Local Anæsthesia—Mr Richardson . . . 373
Dr Kidd on Nature of Death from Chloroform 385
Case from Dental Practice. By J. Foster Flagg, D.D.S. . . . 413
Case of Tic-Douloureux. By Mr R. Thomson 415
Enormous Cancroid Ulcer of the Face and Jaws 417
Congenital Fissure of the Soft Palate Cured by Successive Cauterisation . 432

DENTAL SURGERY AND MECHANICS.—*Continued.*

PAGE
Improvements in Dental Instruments. By Mr R. Thomson, L.D.S. (*With Engravings.*) 459
On a New Method of attaching Teeth to a Plate by means of Rubber. By William Hopkinson, M.C.D.E. . 462
Observations upon the Existence of a Salivary Calculus in a very Young Infant 463
PAGE
A Clinical Report on Epithelial Cancer 514, 571
Anchylosis of the Inferior Maxilla Cured by the Method of Professor Rizzoli . 516
Case of Ovarian Tumour containing Hair, Teeth, &c. By S. J. A. Salter 517
Case of Separation of the entire Alveolar Process of the Upper Jaw. By Dr C. Guenther 518

Chemistry of Silver in connection with its uses in Dentistry . . . 22
Dental Anomalies and their Influence in the Production of Diseases of the Maxillary Bone. By A. M. Forget, M.D. Translated by Robt. T. Hulme, M.R.C.S., F.L.S. (*With Illustrations.*) 13, 58, 123, 159
Memoir on Tumours of the Dental Periosteum. By E. Magitot, M.D. Translated by Robert T. Hulme, M.R.C.S., F.L.S. (*With Illustrations.*) . 215, 271, 332, 280, 420, 464, 506
On the Teeth and Maxillary Bones in the Highest Forms of Quadrumana, considered in relation to the same Structure in the Human Subclass. By F. C. W. . . 324, 374, 433
On the Teeth in Man and the Anthropoid Apes. By F. C. W. . 474
On the Teeth in the Varieties of Man. By F. C. W. . . . 519, 559

PROCEEDINGS OF DENTAL SOCIETIES.

Pennsylvannia Association of Dental Surgeons . . 35, 219, 346, 486, 574
Odontological Society of London 40, 132, 576
London School of Dental Surgery—Mr Cartwright's Address . . . 278
Meeting of Dentists in Paris . . 344
American Dental Association and American Dental Convention . . 444
Society of German Dentists . . 452
America, Letters from . . 33, 173, 444
Birmingham Dental Dispensary . 40, 365

COLLEGE OF DENTISTS OF ENGLAND.

Annual General Meeting . 82, 453, 501, 552
Election of Members 95
Conversazione, January 10 . . . 133
Protest of the College of Dentists . 143, 175
Conversazione and Distribution of Prizes at the Metropolitan School of Dental Science, April 12 229
Meeting of Examiners . . . 244, 552
Regulations relating to Candidates for Membership by Examination . . 244
Conversazione, June 19 . . . 354
List of Members 357
Arrangements of Session 1860-61 . 453
Conversazione, Oct. 30—The President's Address 544
College Arrangements 51, 106, 154, 202, 250, 310

PROFESSOR ERICHSEN'S LECTURES ON THE SURGERY OF THE MOUTH AND JAWS, pages 42, 96.

MR HULME'S LECTURES ON THE STRUCTURE AND DEVELOPMENT OF THE TEEEH, pages 240, 292, 386, 577.

LECTURES BY DR B. W. RICHARDSON ON ANÆSTHESIA AND ANÆSTHETICS.

PAGE
Lecture I.—On Substances classifiable as Anæsthetics 392
Lecture II.—On Substances classifiable as Anæsthetics (Concluded) . . 493
Lecture III.—Physiological Effects of Anæsthetics 497
Lecture IV.—Symptoms of Anæsthesia and Administration of Anæsthetics . 589
Lecture V.—Causes which modify the Action of Anæsthetics—Dangers incident to Anæsthesia 593
Lecture VI.—Death from Anæsthesia—Post-mortem Indications . . . 596

METROPOLITAN SCHOOL OF DENTAL SCIENCE.

Introductory Lecture on Comparative Anatomy. By T. Spencer Cobbold, M.D., F.L.S. 29
Notices to Students 52
Introductory Lecture on Dental Mechanics. By Mr W. Perkins, M.C.D.E. 65
Examination in Comparative Anatomy 81
Introductory Lecture to the Course of Chemistry and Metallurgy. By Dr A. J. Bernays, F.C.S. 129
Introductory Lecture on the Principles of Surgery. By T. Spencer Wells, F.R.C.S. 166
General Examination of Students 172, 227
Distribution of Prizes 229
Introductory Address at the Opening of the Second Session. By Robert T. Hulme, M.R.C.S., F.L.S. . . 528

REVIEWS.

Lectures on the Medical History and Treatment of Diseases of the Teeth. By B. W. Richardson, M.A., M.D. . 189
On the Curative Treatment of Neuralgia, with the aid of Galvanism. By Harry William Lobb, F.S.A., M.R.C.S.E., &c. 245
A Practical Treatise on Operative Dentistry. By J. Taft, Professor of Operative Dentistry in the Ohio College of Dental Surgery 299
First Traces of Life on the Earth; or, The Fossils of the Bottom-Rocks. By J. Mackie, F.G.S., F.S.A. . . 302

MISCELLANEOUS.

PAGE
Medical Act and Special Diplomas . 50
The Medical Act—Ladd *versus* Gould . 104
The Royal College of Surgeons of England—Bye-Laws relating to Dental Surgery 144
The Dental Certificate of the College of Surgeons—Opinions of the Medical Press 147, 183
Letter from our American Correspondent 173
Protest of the College of Dentists . 175
College of Dentists and the Royal College of Surgeons 177
Hull Medical Registration Association—Protest from Medical Practitioners 188
Saturday Half-holiday . . . 244
Morrison *v.* Churchill—'British Journal of Dental Science' 399
Fresco *versus* May 405
Death of Dr Chapin Harris . . . 552

CORRESPONDENCE.

Letter from Mr G. H. Jordan . . 51
,, ,, A Tooth-Drawer's Ghost . 148
,, ,, Mr Robert Thomson . . 152
,, ,, Messrs Shirreff and Son . 153
,, ,, Mr W. Perkins . . 153
,, ,, Mr Henry Long Jacob, M.R.C.S.E. . . . 194
,, ,, An Old Practitioner . . 195
,, ,, A Dentist's Assistant . 197
,, ,, M.R.C.S. 198
,, ,, Mr James Childs . . 199
,, ,, Mr G. H. Jordan . . 200
Letter from Aspera Sequar . . . 200
,, ,, Vigilans 201
,, ,, Dr Purland . . . 201
,, ,, Dr Alfred Carpenter . . 246
,, ,, Mr S. L. Rymer . . 248
,, ,, Mr G. H. Jordan . . 249
,, ,, Mr Henry Long Jacob, M.R.C.S. . . . 307
,, ,, Mr J. M. Slater . . 406
,, ,, Mr George Owen . . 406
,, ,, Verax 501

OBITUARY.

Andreas Retzius 309
Mr James Harley 453

THE

DENTAL REVIEW.

JUNE, 1859.

FUTURE PROSPECTS.

To those who have taken an interest in the progress of Dental Politics the prospects of the Profession at this moment must afford supreme satisfaction. The year 1859 has brought with it success little anticipated, and hopes little hoped for. Animosities have been signally quelled; those who differ agree to differ in friendship; the tone of our literature has undergone improvement; personalities are well nigh extinguished; and from the peace which is thus being established, progress, liberal, refined, and steady, is the result.

It must have been felt during the late disputes which have marked the organization of our chaotic body, that the exertions made to secure such organization were rather for the future than for the passing time. We know that this has been felt, and have heard many express the belief that the anxieties and labours to which they were being subjected were but the bases of an after structure which in their own time would not appear before them. Without giving way to hopes over-sanguine, we feel that the dark side of the picture is not in reality so long to be dreaded. To us it seems that the realizations of a bright and useful future are at hand, and that those young men who are now actually before us in our workrooms are the coming representatives of a profession such as we have not yet seen in any country where Dentistry is practiced, a profession educated, liberal, and fraternal. The event which promises most towards this consummation is given out in the establishment of the School of Dental Science, now fully organized and announced. Nothing could be more opportune, nothing more beneficial than this organization. When in our last we briefly commented on the formation of this school, we were not prepared for the fulfilment of the engagement in that completeness in which we now accept it. The advantages of a complete school, with all the accessories required, are now placed within the reach of our students. The American Colleges, with their years of growth, are not more comprehensive. It is truly an honour to Dental Surgery that such a school should be possible, and it is equally an honour to us, as indicating the respect in which we are held, to see that gentlemen of the medical world, men who are engaged in the active duties incident to teaching and to practice, have given to us their efficient services, and joined with members of our body to add force and fact to our first educational scheme.

In founding their school it has been clearly the intention of the promoters to enlist into the work of teaching none but proficients. It is not that a staff of untried men, ambitious only to be considered as teachers and selected after the fashion of a friendly whist club, are about to dilate on educational topics. On the contrary, every professor of the school, with one exception, and that exception a necessity, is a teacher, and a teacher of the very same science as that for which he is announced in the prospectus of the school. These men, with the subjects on which they are to dwell "familiar in their mouths as household words," and with all the appliances of their respective arts to boot, will in natural and comprehensive language lay before the student of Dentistry a world of knowledge for which his predecessors have looked long and in vain. The education is moreover to be practical in its nature, experiment and demonstration being the foundations of the instruction supplied.

The cost of the education thus offered is another fact of moment. The fee comes within the reach of every student; indeed to every student who shall deserve it, the certificate of attendance on the complete course of Lectures will alone be a handsome compensation for the first simple outlay, to say nothing of the mental attainments derivable from the study enforced; attainments applicable to the work of each day in the battle of life.

In connection with the facilities for *education* thus described, we must also refer, as to another indication of progress, viz., to the facilities for *qualification*, by the examining ordeal, now granted by the College of Dentists. The members of the College are naturally not a little proud of the results which their Council, in the midst of all its struggles, and in the midst of some forced and confessed faults in policy (all well meant by the way) has achieved. They look on this new educational scheme as one of the first fruits of their exertions. When last year the College established a course of systematic teaching, it opened the way, say the friends of the College, to this more durable and comprehensive system. We cannot but give our sanction and sympathy to this feeling ; the feeling is true and honest, and may be expressed without offence to any political creed, or any particular politician.

But the College by its new law in reference to examination, and its principle of admitting all men to its membership who may be able to pass such examination, takes another step which, if supervised with prudence, will mark a second successful point in our history. The difficulties which will meet the Council in fixing the qualificational test are not light, but if the Council shall determine, as we have every reason to believe it will determine, to sit down to its work with full resolve to do the work conscientiously and firmly ; to adjudge an examination which shall be fair and honourable, and yet not out of reach of the majority ; we have no fear as to a successful issue.

Meanwhile it is an encouraging fact, that the public are not uninterested spectators of our progress, and that public opinion, which in this country always goes in favour of independence, favours the earnest exertions now being made. That which has given the American Dentist his standing has been public opinion. Rightly or wrongly, the public has believed that the American Dentist, having had the advantages of a systematic education in his science and art, is better qualified than he who has learned by stray lessons and intuitive skill; and the public faith thus raised has given to American Dentistry an *éclat* attended with many substantial advantages. There can be no doubt that the common belief thus expressed is not without a measure of common sense. There is no denying the fact that the man who is educated in general things, and is equally educated in any particular branch with one who is *only* educated in the same particular branch, stands at all times and in all places the best chance of success. To this fact the Dentists of England are now fully alive, they are sensible of the defects of their past educational system, and are prepared to second, by their advice to their pupils, any new system that shall lead to effective reforms in the future. At last the facilities they themselves would have prized so much are opened to their followers, and if we do not mistake our brethren altogether, the projectors of the School of Dental Science will be met, by the Profession throughout the length and breadth of the land, in a spirit of honest, hearty, and effective co-operation.

THE COLLEGE OF DENTISTS.

We have reason to believe that the Body of Examiners of the College of Dentists is finally constituted. We are not yet at liberty to publish the names of the Examiners, but we may mention that the Council has been entirely successful in securing the services of gentlemen eminently qualified in every particular for the important trust reposed in them. In the appointment of Examiners the Council recognize the importance of selecting those only whose professional acquirements and position, irrespective of their political views, would render the College examination a thorough and unmistakable test of proficiency.

Thus, as we understand, the Body of Examiners consists of several practising Dentists of high standing, some of them Members of the College of Dentists, others Fellows or Members of the College of Surgeons, but unconnected at present with any Dental Association, and again, of independent Dentists unconnected with the College of Surgeons. There is also a medical element in the Body of Examiners.

In an early number we trust to be enabled to furnish distinct information with regard to these important appointments, together with full particulars of arrangements for the examinations.

DENTAL SURGERY AND MECHANICS.

THE CAUSES OF IRREGULARITY OF THE TEETH.

BY MR JAMES ROBINSON.

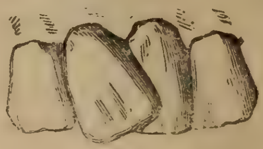
(Illustrated by Felix Roffe.)

Continued from page 273.

The too early extraction of the deciduous teeth, before the permanent are sufficiently developed to take their places, is also a cause of serious irregularity; and in some of these cases an irremediable and permanent deformity is produced by the contraction of the alveolus. The growth and advancement of the dens sapientiæ, when an insufficiency of space exists for its development, is not only a source of great suffering, but frequently the immediate cause of irregularity by the pressure exerted towards the anterior part of the mouth, which until their development presented a regular denture.

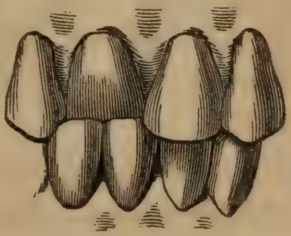
The following represents the two centrals overlapping each other from this cause.

No. 1.



Although these irregularities are chiefly confined to the front of the mouth, they do occasionally occur at the sides, the bicuspids being affected in the same manner. Many cases coming at first under the denomination of temporary irregularity, if allowed to continue beyond a certain period, would become a permanent irregularity;—for example, when a permanent tooth pierces the gum, either too anteriorly or too posteriorly to the dental circle, the consequence is the irregularity here represented.

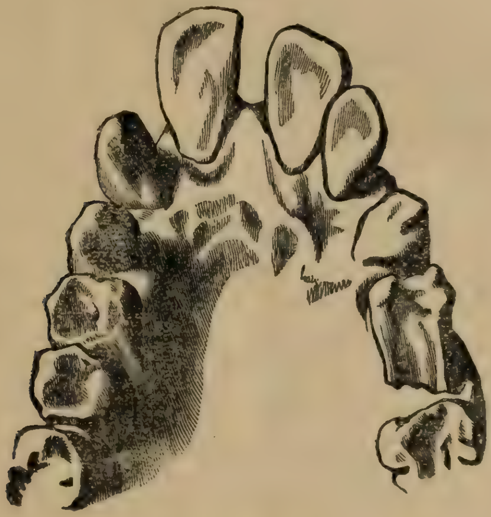
No. 2.



The development above given must necessarily become a permanent deformity in consequence of the approximation of the opposing teeth retaining the irregular tooth in that position, unless recourse be had to mechanical contrivances, which I shall explain to the student when I come to speak of the treatment of these cases.

The following case came under my care, in which the upper jaw from malformation projected over the lower, so that when the mouth was closed the upper incisors protruded to such an extent that they covered a large portion of the lower lip, whilst the incisors in the lower jaw approximated half an inch or more posteriorly upon the palate.

No. 3.



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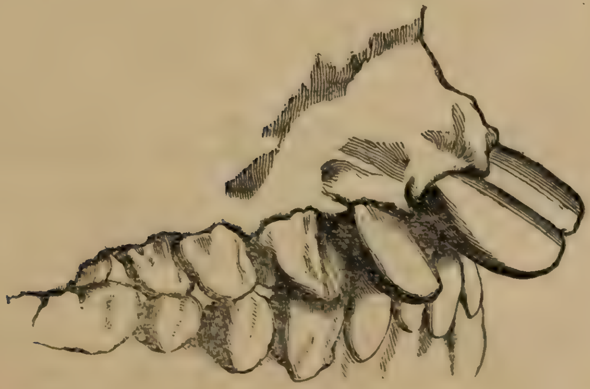
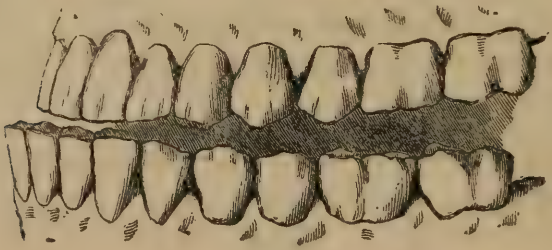


In this case it will be observed that the palatine arch is deep and contracted at the angles. Again, the lower jaw may protrude in a similar manner, so that in the approximation of the teeth the upper incisors close behind those in the lower jaw.

No. 5.



Prevention of Irregularities of the Permanent Teeth.—The young practitioner will too frequently find in the exercise of his professional avocation, and in opposition to his better judgment, that he will be thwarted in his endeavours to carry out his scientific views for the development and the ulterior arrangement of a perfect and uniform denture, by the dictation, and, in some cases, even interference of the parents, or perhaps, worse than all, by some doting old nurse. In these cases argument will be useless, and he will have little prospect of being able to do his duty, unless he can successfully appeal to the more reasonable nature of the parents, and use his persuasive powers to induce them to place the young patients solely under his charge at the commencement of the development of the second denture—in which case, I subscribe to the rules laid down by Dr Chapin Harris in examining the mouths of children with the view of preventing irregularities.

The child (Dr Harris says) should be placed under the care of a dental practitioner at about six years of age. The operator should examine whether the arch of the jaw is well developed, and its angles present a semicircular form. The front temporary teeth, which originally were laterally in contact and crowded, being now somewhat separated from each other, so as to indicate a gradual expansion of the maxillary bone, and if the first permanent teeth have advanced, are well formed and of moderate size, without any prominence of the gum behind the temporary showing the advance of the permanent teeth. If the teeth of a child resemble those of one of his parents, the arch of whose jaw is broad and well defined, and whose teeth are regular as regards shape and physical character, the circumstances may be considered auspicious to the development of a regular set of teeth. In fact, in sound and healthy constitutions, where these observations are made correctly, the aid of the Dentist is but seldom required except to assist nature in removing impediments to her development. In the management of the dentition of the adult teeth much will depend on the experience and judgment of the practitioner. If he be properly informed upon the subject, and gives to it the necessary care and attention, the mouth will, in most instances, be furnished with a healthy, well arranged, and beautiful set of teeth.

Mr Fox, in recording his opinions upon this subject, says, "An opportunity thus presents itself for preventing irregularities of the second denture, but in this everything depends upon correct knowledge of the time when a tooth requires to be extracted, and also the particular tooth; for often more injury is occasioned by the removal of a tooth too early than by leaving it too long, because a permanent tooth, which has too much room very long before it, will sometimes take a direction more difficult to alter than a slight irregularity occasioned by an obstruction of a short duration."

Other eminent dental practitioners object to the removal of the temporary teeth, amongst whom is Mr Bell, on the ground that it produces a contraction of the maxillary arch, and injury to the uniform deposition of the enamel through the premature destruction of the peduncular arrangement that exists between the first and second teeth.

Although the preceding observations are the opinions of some of our eminent writers upon the subject of second dentition, and perhaps, as a general rule, the observations may be held good at the commencement of the second dentition, providing the characteristic development of a well-defined maxillary arch and its expansions denoted by the separation of the central teeth of the temporary have been observed, in those cases, the removal of the deciduous teeth before the second are sufficiently advanced to take their places would be diametrically opposed to the laws of nature. But the case is totally different, if during the advancement of the second teeth they meet with such obstruction from the first that their future development and arrangement are interfered with—to leave such a condition of things to nature would be, at least, to presume that every human jaw was the exact size, shape, and form to admit a regular second denture ; and for this reason there are many cases neglected to be treated, in which the assistance of a dental practitioner was peremptorily demanded, and where the future appearances of the patients depended upon his experience, skill, and judgment.

The superintendence and assistance of the Dentist will generally be required when the permanent central teeth of the lower jaw pierce the gum, either *behind* or before the deciduous ones; in those cases it will be necessary to remove the temporary central teeth, and if there be not room to admit the permanent in the space from their increased size, one or both of the laterals should be extracted, but this should be delayed as long as possible, to ascertain whether the gradual and natural expansion of the jaw may not provide sufficient room—for a too premature removal of the laterals takes away the natural support by the process of absorption from the permanent centrals, and thus causes an unsightly separation, which will require the aid of india-rubber rings or dental ligatures ultimately to rectify; should, however, such a condition of the teeth exist when the child is first seen by the Dentist, the mode of proceeding would be to permit the separation of these teeth to remain without interference until the permanent incisors in the upper jaw have considerably advanced, and by an occasional inspection of the mouth ascertain the advancement of the laterals in the lower jaw. If there be a prominency of gum at those points where these teeth should appear, a ligature of Dentist's twist should be gently tied around the necks of the two central teeth; but what is still preferable in these cases is the small vulcanized india-rubber ring—by gradually diminishing the size of the latter, the separated teeth may be easily brought together, and retained in this position until the advancement of the laterals — whilst the case is under treatment it will be necessary to change the ligatures employed every two or three days. The same observations will apply to the extraction and treatment by ligatures and rings of the upper centrals—in applying either the student must be cautious not to cause too much pressure on the posterior angles of the teeth, otherwise a greater difficulty will result, by forcing the lateral edges towards the palate, and the teeth will assume an angular position. To obviate the probability of this occurring, I generally make the pressure more forcibly on the posterior, or sometimes the anterior angles, by inserting under the ligature, at the point we are desirous of exerting the most pressure, an extra piece of india-rubber, or a small piece of hickory wood. If the rubber rings be used it will be necessary to take the precaution to secure them near the cutting edge of the teeth, so as to prevent their slipping upwards, causing irritation in the gum; this can be prevented by a fine flat piece of soft gold wire secured to the ring in front of the tooth, and passed over the cutting edge and fastened to the ring at the back.

[To be continued.]

THE LUCIFER MATCH DISEASE, OR ROTTING OF THE JAW-BONE.

From the 'Medical Circular,' May 18th.

One of those rare and singular but hitherto singularly incurable cases of destruction of the lower maxillary bone by means of fumes of phosphorus, is now in St Bartholomew's Hospital, where, a few days ago, it was found necessary, as a last resource, to take away the entire jaw-bone completely dead. We have seen so many cases of this fell disorder in the hospitals of London from time to time, nearly always admitted when they are beyond every means of cure, that we refer to this case rather with an indistinct hope that some ingenuity may be set at work out of doors, amongst our higher class of chemical and medical philosophers, such as those who gave us the safety lamp and vaccination, chloroform and hints on arsenic in wall paperings, so that these hideous diseases of the lucifer-match manufactories may be prevented, or in default thereof, that lucifer-match manufactories themselves might be abolished.

Mr Lawrence, in commenting on this sad case to his class, said that he knew little or nothing of the real nature of the disease, but of the fact of the destruction of this bone, and this bone alone, by the fumes of phosphorus there is no kind of doubt, as several cases, and all exactly alike, have come under the notice of him and the other surgeons of this hospital. Some of our other London surgeons are inclined to believe that the experiments recently made by M. Ollier on the growth of bone artificially, by the transplantation of the periosteum, may lead, or have led, to some further insight into the nature of this disease. Mr Paget, we need scarcely say, had come to a similar conclusion from a study of the process of necrosis, and the functions of the periosteum in such cases.

Mr Quekett has shown that by a special arrangement of rice paper or other thin tissues with lime water, he can imitate the function of what are physiologically termed "raphides," hitherto thought to be as impossible as imitating Haversian canals, cartilage cells, or cancelli ; it seems, too, from the experiments of M. Ollier, that a flap of periosteum retaining its attachment by one of its extremities (the rest being lodged in the flesh or muscles) continues to give off bone, much as the rice paper acts almost like certain vegetable membranes (a piece of onion, for instance), in giving off raphides and oxalic acid crystals ; nay, a strip of periosteum, it is now discovered, may be obtained from the tibia, long enough, according to M. Brown-Séquard, to wind round the bone, or to twist into a perfect corkscrew of bony matter through the muscles—even a new piece of such bone, which with the periosteum has been borrowed, will adhere almost like an epiphysis to the old bone.

So delicate are these processes and operations that they must be "touched with a gentle hand, for there is a spirit" in the process of true generation that will not bear rough handling ; they may be repeated with the periosteum of the same animal on almost every part of his frame, as the deposit of phosphate of lime in the cellular tissue of bone or of muscle goes on alike without any discrimination so long as the same blood supplies the phosphorus. The periosteum of one animal, however, transplanted to the bones or muscles of another of the same or of a different species invariably dies, or loses its power of keeping up its own periosteal functions! We now come to the lucifer matches. On questioning a poor man, not long ago, in one of our hospitals, he told us he was employed at Mile end, where all the chief factories of England are situated ; his occupation all day was to sit over a pot of melting glue and other ingredients, and to cut sticks of phosporus into bits the size of a pea, throwing them one by one into the glue. Surgeons all agree that it is through the contact of the phosphorous acid fumes thus given off reaching the periosteum of the jaw-bones, where it is denuded by loose or absent teeth, that its normal condition of nourishing the bone is altered and finally destroyed. The disease begins in a set of miserable gum-boils, which are lanced, and the bone with its periosteum laid bare ; the teeth all become loose and fall out, the demon of bad surgery keeping pace with the disease. The case operated on by Mr Lawrence was of two years' duration, and on admission the poor man presented all the usual familiar marks of this horrible disease, the ordinary fistulous openings leading down to a rotting and diseased periosteum and a jaw-bone as dead and dry as one might meet in a churchyard, for it is not at all like caries or necrosis.

In something like a dozen of these cases, of which we have now learned the details, the disease commenced quite insidiously, but in the manner just described,—gum-boils, and the glue-pot, and loose teeth at first,—yet such is the infatuation of these poor men at these works, that they still at high wages are content with these gum-boils and loose teeth to go on at the employment ; too many of the poor fellows, in fact, were inclined to make light of such things. The process of nutrition of the bone meanwhile diminishes week by week ; there is little or no pain, till the disease finally passes the point of recovery, the whole bone is literally stone dead, and acts as a foreign body would act ; the jaw now swells to an enormous size ; the health still suffers ; cod-liver oil, tonics, &c., are prescribed, but the function ofthe periosteum of depositing a special form of phospate of lime (according to Professor Graham composed of two tribasic phosphates, one of these an *alkaline* phosphate), has been destroyed by the new phosphorous acid fumes or combinations of the lucifer matches.

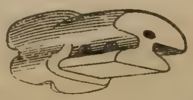
Mr Lawrence, in referring to the perfectness of the process by which the regeneration of living bone is usually brought about in cases of common necrosis—as remarked too by Mr Paget, still, if possible more complete in the lower invertebrate animals than in man himself,—could not help wondering at the total and incurable destruction of the jaw-bone that is worked by the acids of the lucifer-match process. In one case, indeed, we observed the surgeon on a "taking in" day, seeing the poor man for the first time and examining the swollen jaw, to pick out the entire bone with his fingers, to the dismay of the poor patient. It was as dead as a fossil, but as perfect ; this has been seen more than once in the hospitals.

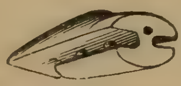
At Nuremberg, in Germany, we were told by Mr Paget, the great centre in Continental Europe for the formation of "lucifers," this horrible disease is also very common, and has been very fatal ; it is a disease, not in any shape or at all likely to be seen in small towns ; nor do we see why some legislative precaution should not be enforced to banish it altogether from our hospitals. Of one thing there can be no doubt, that the poor men employed in such factories do not at all understand the danger they are exposed to, and some obvious prophylactic measures are systematically neglected.

W. T. TAYLOR'S NEW TEETH FOR THE VULCANITE BASE.

We have been favoured by Mr Taylor with an inspection of several new and clever designs for teeth, specially adapted for the above base, most of which possess peculiar merits, and evince a continued desire on the part of Mr Taylor to meet the requirements of this age of improvements; and here, in passing, it is a pleasurable thing to remark that these new teeth have not been patented, which is a greater novelty these times than the teeth themselves. The first thing now one has to do before availing oneself of any new arrangement is to instruct the lawyer to ascertain the patentee's right, and then carefully weigh one's own legal position, and be exceedingly grateful if permitted to continue practice without receiving more letters from sharp-practising attorneys, threatening all sorts of dreadful proceedings, than thankful letters from patients.

We have trespassed into making these remarks, feeling that the present system of patenting almost every deviation from the old-established practice has become an intolerable nuisance, and must be discountenanced.





It will be seen at once, from our engraving of the molar and central incisor, that the principle of formation is applicable and ingenious—it is, in fact, a combination of dovetailing and holes—so that the vulcanite, being pressed through the holes, secures the tooth so firmly as to dispel all apprehension of the usual teeth with platina pins breaking away.

Other advantages are, that the teeth may be ground to suit any case however short, and be adapted to any bite however close. These attainments, combined with the well-known strength of Mr Taylor's teeth, appear to us to render them perfect, and for which he is entitled to our best wishes.

REMOVAL OF THE UPPER JAW FOR FIBRO-PLASTIC DISEASE.

[*From the 'Lancet,' May* 28.]

THE important operation of excision of the upper jaw-bone, on the right side of the face, was performed by Mr Prescott Hewett, at St George's Hospital, on the 19th inst. The patient was a healthy man, a little over fifty years of age, who has suffered from disease of the antrum for between three and four years. He was in the hospital eight months ago, under the care of Mr Cæsar Hawkins, at which time there was considerable doubt as to the true nature of the case, because fluid could be injected into the antrum. The belief, however, was entertained by Mr Hewett that there was, notwithstanding, a tumour of that cavity. After remaining for some months, he left the hospital, and was re-admitted five weeks ago. There was still a difference of opinion as to the nature of the case, though the presence of a tumour was now evident enough, producing a projection of the anterior wall of the antrum, and a certain amount of disfigurement. It was either malignant or non-malignant: if the former, it was thought that an operation was unjustifiable. Mr Hewett believed it to be a fast-growing fibrous polypus, and very vascular. The growth was now in the antrum ; it had crept into the nostril and the lachrymal canal (as evidenced by a lachrymal tumour), and had spread under the orbit ; it had besides absorbed part of the cheek. Then came an abscess, with loose infiltration in the skin overlying the tumour : this was believed to be non-malignant. Two weeks back another consultation was held, and an operation approved of, which was undertaken by Mr Hewett. Accordingly, on the 19th inst., the patient (who was otherwise a very healthy man), being seated in a chair, and placed fully under the influence of chloroform, an incision was made from the angle of the mouth backwards towards the zygoma, and another from below the inner canthus of the eye, downwards alongside of the nose, round the ala, into the nostril, and then through the mesial line of the lip. The flap was then dissected up, and after using the forceps, the bone, which was broken into two portions by the disease, came away in two pieces, the lower first and the remainder afterwards. This circumstance added somewhat to the difficulty of the operation, but every fragment of the disease was taken away. The tumour did not present the character of malignant disease, but a portion of it, which was examined before the operation, showed it to be benign, and composed of fibro-plastic material. Very little hæmorrhage ensued, until Mr Hewett cut into the pterygoid fossa, when he happened to wound the internal maxillary artery, which was followed by a spirt of blood. This, however, ceased on the application of the ligature, which was the last step of the operation previous to bringing the edges of the flap together by sutures. The floor of the orbit was removed in this instance ; and as all the disease has been taken away, it is to be hoped that the patient will not only recover, but that he will be effectually cured of his malady.

CASE OF DROPSY OF THE ANTRUM.

Mr John Green, M.R.C.S., of Sedgley, relates the following in the 'Lancet' of the 14th ult. Mrs W——, aged thirty-two, applied on the 20th March, to obtain my opinion about a tumour in her face that she had been told was cancer. There was, in reality, a large hard swelling in the superior maxillary bone of the right side, free from soreness, but attended with a constant pain of an uneasy, gnawing character, not severe, though depriving the patient of her rest. Close to the orbit the bone was well defined and normal. On careful pressure, at the lowest portion of the tumour, the attenuated parieties of the antrum were found to give way with a crackling sound. Inside the mouth the bone was largely distended, completely filling up the cavity between the alveolæ and the muscular covering; the mucous membrane was highly vascular. Several of the teeth were slightly decayed, but not sufficient to warrant the suspicion that dental irritation was the original cause of the mischief.

As the patient gladly consented to any means that would be likely to relieve her, I proceeded to extract the first molar tooth, and introduced a trocar through its socket into the cavity of the antrum. From six drachms to an ounce of a thin yellowish fluid, of an intensely bitter nauseous taste, was then drawn off. Under the microscope, and even with the naked eye, it could be seen to be loaded with cholesterine, as related in other cases of this nature. The relief from pain was instantaneous after the operation; the swelling diminished, and the parts became soft. In the after treatment the bowels were acted upon, the cavity was several times injected with warm water, and the wound prevented from closing. The discharge gradually decreased, and in the course of a week had entirely ceased. The parts had recovered their natural size, and there was no pain. The wound was now allowed to heal.

She could give no account of the original cause of the affection, not remembering ever having had a blow on the part. She told me that it "came itself" between two and three years ago, and had been slowly increasing up to the time that she came to me.

May, 1859.

Sans Dents.—The following curious case is recorded in the current number of the 'Dental Register of the West,' by Dr A. Berry:—"A negro man, aged about forty-five years, belonging to Col. W. H., of Claiborne, with whom he has been during ten years past, says that he never had any teeth! I examined his mouth a few days ago, and found the alveolar ridges less developed, and the gums over them, not much, if any, firmer than is common with edentated persons; but the inferior alveolus, although very low, is broader than usual, and meets the superior very fairly for a considerable part of its anterior portion, enabling its possessor to masticate readily any kind of food. His face presents a singular shortened appearance. He is healthy; and I have no doubt of the truth of the report as to his want of teeth."

CHEMISTRY.

Under the head "Chemistry" we purpose to add a new and distinct feature to the REVIEW. It is intended to reprint the very valuable papers of Dr PAUL on the subject published in the 'Quarterly Journal of Dental Science,' and when completed, to follow them up from time to time by similar articles written expressly for our pages.

CHEMISTRY OF GOLD IN CONNECTION WITH ITS USE IN DENTISTRY.

BY B. H. PAUL, PH. D.

SINCE gold is almost always met with native, and in a state of comparative purity, the metallurgic operations by which it is extracted from its ores are extremely simple in most cases. The working of certain auriferous minerals, such as the galena, copper pyrites, and iron pyrites of many localities, and the tellurium ores of Transylvania, involves operations of a more complex character; but the extraction of gold in these cases is only an accessory to the production of other substances. Although native gold contains only very small proportions of silver, copper, and the rarer metals, such as palladium, iridium, etc., it is necessary to separate these admixtures. This constitutes the art of refining, which, as practised at the present time, is generally effected by treatment in the wet way, either with nitric, sulphuric, or nitrohydrochloric acids.

For the separation of silver from gold by means of nitric acid, it is necessary that the two metals should bear to each other a certain quantitative relation—that the silver should not amount to less than twice the weight of the gold with which it is alloyed. If the amount of silver is less than this, it is either not at all acted upon by nitric acid, or only to a small extent. If the silver in the alloy amounts to more than three times as much as the gold, the separation of the metal by means of nitric acid is perfect; but there is an important difference between these two cases with regard to the condition in which the gold is obtained after the separation of the silver. Thus, when the silver amounts to more than three times the weight of the gold, treatment with boiling nitric acid leaves the gold in a state of a finely divided pulverulent mass of a dark brown or black colour, according as the amount of gold is greater or less. In this condition there would be considerable risk of waste in collecting and washing the gold. However, this disadvantage may be easily provided against, for when the silver in the alloy amounts to from two to three times the weight of the gold, it is dissolved without the gold being disintegrated, the latter metal remaining as a coherent spongy mass of the same shape as the original fragments of the alloy. In refining gold, containing, as is frequently the case, from a few thousandths to thirty or forty per cent. of silver, it is customary to add as much silver to the gold alloy as will make up the proportion of three of silver to one of gold. Hence the term quartation, applied to this operation. Generally the quartation of gold is accompanied by cupellation with lead, which, while facilitating the fusion of the gold and silver, at the same time effects the separation of the copper which is generally present to some extent in native gold containing silver. The action of the lead in this operation is twofold:—First, as a solvent of the gold and silver, rendering them liquid at a temperature far below their melting points—secondly, in yielding, by its oxidation, a solvent for the oxide of copper produced at the same time. The melted alloy of gold, silver, lead, and copper, being exposed to a free current of air passing over its surface, the copper and lead are gradually oxidized, the solution of oxide of copper in melted oxide of lead being absorbed by the porous material of the cupel, until finally there remains only the pure button of gold and silver.

After the relative proportion of gold and silver has been established by quartation, and the copper separated, the separation of the silver from the gold, or as it is technically termed, the "parting," is to be effected by means of nitric acid. For this purpose the alloy should be in small fragments about the size of peas; to which it may be reduced by running the still liquid metal into water from some height. The nitric acid in which the alloy is boiled should have a density of about 1·2, and the ebullition should be continued for fifteen or twenty minutes. Concentrated acid may then be used for separating the last traces of silver, and when the residual gold is well washed with distilled water free from chlorides, and heated to redness in a crucible, it constitutes "fine gold," such as is met with in commerce.

It is highly important that the nitric acid employed for refining gold should be quite free from either chlorine, hydrochloric acid, or sulphuric acid, since these substances would in various ways materially interfere with the result. Thus, in the presence of chlorine, or hydrochloric acid, a portion of the silver, at the moment of solution, would be converted into insoluble chloride of silver within the pores of the spongy gold, and as chloride of silver is not soluble in nitric acid, its separation would be effectually prevented. At a later stage of the operation, when the gold is boiled in fresh acid, some gold might be dissolved. The presence of sulphuric acid would in like manner give rise to the production of sparingly soluble sulphate of silver, and thus the separation of silver would be to a proportionate extent prevented.

The separation of silver from gold may also be effected by means of sulphuric acid. In this case the alloy should contain at least as much silver as gold; it is granulated, after the separation of copper by cupellation in the usual manner, and then boiled in concentrated sulphuric acid, in a platinum or iron vessel as long as sulphurous acid gas is given off. The solution of sulphate of silver is then poured off, the gold washed with water, and again boiled with a fresh quantity of sulphuric acid.

This method of separating silver from gold is much more economical than the parting by means of nitric acid, but it is attended with inconveniences that have been a great obstacle to its general adoption. Among these the offensive and unmanageable nature of the sulphurous acid gas given off during the operation is one of the chief. In addition to this, platinum is not dissolved by sulphuric acid, but remains with the gold. About three per cent. of silver also remains in the gold that cannot be dissolved out by either sulphuric or nitric acid. This residual silver can be separated from gold that has been parted with sulphuric acid, only by treatment with bisulphate of potash or soda. The metal is mixed with about a fourth its weight of sulphate of soda and a fifth its weight of sulphuric acid, the whole heated until the salt becomes liquid, and stirred meanwhile, until the evolution of sulphurous acid ceases. It is a remarkable fact, that although sulphuric acid alone has no influence upon the silver left in gold after the parting, the presence of an alkaline sulphate at once determines the conversion of this silver into sulphate by the sulphuric acid. The sulphate of silver and sulphate of soda must be dissolved out of the spongy gold by boiling it with sulphuric acid as in the first instance, and it may even be desirable to repeat the treatment with bisulphate of soda. It is of importance to keep the temperature of the mass just below redness, in order to avoid the decomposition of sulphate of silver, and the consequent failure of the operation as regards complete separation of silver.

The gold refined by sulphuric acid is sometimes found to be brittle, and deficient in that softness which is characteristic of pure gold. This is owing to the presence of platinum, which, as has been already remarked, is not separated by sulphuric acid. This metal may be, to a great extent, separated by fusing the refined gold with nitre, which has the effect of oxidizing the platinum; however, its separation is not complete, and gold is at the same time oxidized and dissolved by the nitre.

Gold refined by either of these methods cannot be rendered absolutely pure, although with careful manipulation it may be obtained of a fineness of upwards of $\frac{999}{1000}$. The perfect purification of gold is indeed a very difficult operation, and requires very great care and patience. The best method to be adopted for this purpose is to dissolve gold in nitro-hydrochloric acid, the aqua-regia of older chemists, and to precipitate the gold from the solution of chloride of gold thus obtained.

The granulated metal, which by preference may have been refined as far as possible, by either nitric or sulphuric acid, is digested with a mixture of three parts hydrochloric acid and one part nitric acid, at a moderate heat, until completely dissolved. The solution is to be evaporated nearly to dryness, to separate excess of acid, the residue mixed with water, and again evaporated as often as may be requisite for getting rid of all nitric acid. The evaporation must not be carried too far, nor must the temperature be much above the boiling point of nitric acid, or else the chloride of gold might be decomposed. After separating the nitric acid, the chloride of gold may contain a trace of chloride of platinum, as well as some chloride of silver, which is dissolved to some extent by a strong solution of chloride of gold. To separate the latter, the chloride of gold is diluted with a large quantity of water, and the solution set aside for several days in the dark.

When the liquid appears quite clear, it is carefully drawn off from the sediment of chloride of silver, and is then ready for the precipitation of the gold. This may be effected by a variety of reagents, among which sulphate of iron is generally employed. When a solution of this salt is added to the chloride of gold solution, there is a mutual decomposition, two-thirds of the sulphate of iron is converted into per-sulphate and one-third into per-chloride, while metallic gold is deposited in the state of an extremely fine powder, of a purple, or even black colour at first, and gradually becoming yellow when it collects at the bottom of the liquid. To precipitate one hundred parts of gold, four hundred and twenty-three parts of the crystallized green sulphate must be used.

The precipitated gold must be thoroughly washed with water containing some hydrochloric acid, and may then be dried and melted with a small quantity of nitre and borax. As chloride of platinum is not decomposed by sulphate of iron, the gold prepared in this way will be free from platinum, and if the solution of chloride of gold is sufficiently diluted, and left long enough to ensure the deposition of chloride of silver, it will also be free from silver.

When the gold is required in the state of sponge, a solution of oxalic acid is a better reagent for effecting the precipitation. But with regard to this particular very much depends, not only on the reagent employed for the precipitation, but also on the way in which it is applied. Thus, when the chloride of gold solution is poured into the solution of sulphate of iron, the precipitated metal is obtained as a much finer powder than when the sulphate is added to the chloride solution. By copious dilution of the chloride also, the precipitated metal is obtained in a very minute state of division, while concentration of the liquid, or precipitation at a boiling temperature, have the opposite effect.

The gold precipitated by solution of oxalic acid has a fine yellow colour. The best way of obtaining the gold in the state of a fine powder, that will form a sponge, is to add to the concentrated solution of chloride of gold a small quantity of oxalic acid, then adding to the cold solution enough carbonate of potash to convert nearly all the gold in the solution into aurate of potash, lastly adding a large quantity of crystallised oxalic acid, and heating the liquid rapidly to the boiling point. By this means the gold is obtained in the state of a soft yellow sponge, such as is required for stopping teeth.

The gold of the Ural frequently contains, disseminated through it, small fragments of a compound of osmium and iridium, which have been found very troublesome in working the gold. More recently the same thing has been noticed in some of the gold from California. These granules do not alloy with the gold when it is melted, but remain imbedded in it, so that when the metal is rolled, it splits open, and exposes little cavities, filled with a black powder, consisting of iridium, the osmium having been for the most part volatilised. This impurity of gold interferes very considerably with its fitness for being worked, and its removal on the large scale involves considerable trouble; but on the small scale it may be easily effected by dissolving the gold with nitro-hydrochloric acid, which leaves the iridium undissolved as a black powder. When the diluted liquid has become perfectly clear by deposition, it will, when decanted off, be fit for precipitating the gold by any of the suitable reagents.

In purifying gold by the methods of quartation and parting, the nitric acid solution decanted off from the spongy gold will of course contain a considerable quantity of nitrate of silver. This must be recovered from time to time, and reduced to the metallic state. For this purpose the silver may be precipitated directly by means of a plate of copper immersed in the solution of nitrate. This plan is, however, objectionable, because the liquid generally contains a large excess of nitric acid, which generates nitrous vapour, in contact with copper, and also because of the cost of copper, and the consequent necessity of saving the cuperous liquid, and crystallising the nitrate of copper. Moveover, it is not so easy to obtain pure silver by this method as by reduction with zinc.

For this purpose the silver is in the first place to be precipitated in the state of chloride by adding hydrochloric acid to the solution of nitrate, until no further precipitate or milkiness is produced. This precipitate of chloride of silver, being very dense, may be washed by decantation while kept from the light. When it is thoroughly washed, sulphuric acid is added to the liquid containing the chloride, enough to render it distinctly acid; then several thick plates of zinc are plunged into the chloride, and the whole is left for twelve or more hours, until the whole mass of the precipitate has acquired a kind of olive-green colour, and, when rubbed with the nail on paper, presents metallic lustre. This is the metallic silver resulting from the reduction of the chloride. The chemical change is simply a transfer of the chloride from the silver to the zinc, the products being metallic silver and chloride of zinc. This process is remarkable as a striking exception to the general rule that chemical action does not take place between solids. The sulphuric acid may, however, be the carrier of zinc, in a liquid state, as sulphate of zinc to the chloride of silver, though this does not seem to be the case from the rapidity with which the reduction of the chloride takes place. The moment the zinc plate touches the chloride, a black line appears at the place of contact, and when the zinc plate is left quite undisturbed—which is essential to the reduction—this black line gradually widens, extending like a shadow over the surface of the entire mass of chloride. When this change of colour has been completed, the mass should be carefully turned over by the zinc plates, without, however, being stirred about; and if any patches of unreduced white chloride are found to remain, it is only necessary to thrust one of the zinc plates into the midst of them, and allow a little longer time for the reduction to be completed. As soon as that is the case, the zinc plates are withdrawn, and the spongy precipitate of silver washed by decantation until every trace of chloride of zinc is removed. It is best to use boiling water for this purpose, as it makes the silver more coherent and facilitates its deposition. Care must be taken also, in drawing off the washing water, that the fine particles of silver are not washed away. A very large loss may be incurred in this way. When the silver is washed it should be thoroughly dried in a hot-air closet, mixed with a little nitre and borax, and melted.

Materials containing filings or scraps of gold and silver are best worked by melting them with litharge, carbonate of potash, or soda and charcoal. The proportions must be regulated according to the nature of the materials from which the gold is to be separated, and the probable amount of gold; the object being to reduce enough lead from the litharge to dissolve out the gold from the substances with which it is mixed, so that while they are melted by the joint action of the heat and alkali, this alloy of lead and gold sinks to the bottom and collects together in one mass or button, which is taken from the crucible by breaking it after it has become cold. By cupellation the lead in this button is separated, and if it also contains silver, or if it is desired to refine the gold with nitric acid, sufficient silver is to be added during the cupellation, for making up the proportions of two or three times as much silver as gold. The button of gold and silver thus obtained is worked in the usual manner, as above described.

PROCEEDINGS OF DENTAL SOCIETIES.

EXTRACTS FROM AN ADDRESS

DELIVERED TO

THE GRADUATES OF THE OHIO COLLEGE OF DENTAL SURGERY.

Session 1858-59. By Dr Allport.

It is a common fault of young practitioners to promise too much. Let me caution you against this; for you will find that *all* are liable to failures. You ought to do your work well, but never *warrant* it. When the real benefits of dentistry were not understood, or acknowledged by the public, perhaps it was proper that the dentist should guarantee a result, which was doubted by a majority of even intelligent people; but now the intelligent regard dental operations as not only useful, but indispensable to health and comfort, and no such necessity for a guarantee now exists. The patients who come to you ackowledge, by their coming, their belief in the benefits of dentistry, and in your skill. You occupy the same relation, in this respect, to your patient, that the physician does to his. The honourable physician never agrees to cure his patient. He knows that, if treated ever so well, the patient's own neglect, or carelessness, may make that treatment useless, and even injurious. The *Quack* will not hesitate to guarantee a cure of the most hopeless case, always *provided* he is paid *in advance;* but the consistent physician honestly tells the probability of success, and then simply pledges his best energies and skill; and on these he relies for business and reputation. No matter how well the dentist does his work, its durability will depend very much upon the patient's care. If you warrant it, they will be very apt to transfer the responsibility from their own shoulders to yours. The value of your work depends upon the action of both; and if either fail, the work will fail. On your part, the honour of a man, and skill in your profession, call for the very best work. On the part of your patient, care and cleanliness must be observed. You will find it to be of great advantage, especially with children, to request, and *insist*, that they should see you often. You ought then, as far as possible, to insist upon the thorough cleanliness of their teeth; and if they will not attend to this, your work will fail, in spite of the best operations.

If your work does fail, and you can see that the fault is yours, you are bound, as an honest man, to make it good; but if the fault is not yours, your patients have no right to hold you responsible. Our *poorest* and most *unprincipled* dentists are those who give the most positive guarantees against failure.

I think it was Poe who said, "Quack is an ugly word, which never should be used except in the mouths of ducks;" but we have a right to say, that the physician, or dentist, who stoops to the expedient of warranting, in order to gain business, degrades himself and his profession, and *well merits* the appellation of *Quack.*

* * *

Our specialty in the healing art will seldom make it necessary for you to visit the sick room; and perhaps never to stand by the bed of the dying. You will, however, be called to witness much suffering; and, when inflicted by yourselves upon sensitive women and children, you will be glad to be relieved from the unpleasant duty. Your patients do not come to you from choice, but from necessity; and you are called to do your duty, even though it conflicts with your sympathy. You should study to make the pain of your operations as light as possible; but no consideration should prevent a faithful performance of your duty. You should always be kind; but there are few cases, where your sympathy expressed, will not excite rather than relieve your patients' fears, and make them less able to endure the necessary suffering.

In no case be rash or hasty; but when you know your duty, be firm, and push on your operations with manly courage. Your courage will incite courage in your patient; and he will not only submit, but respect you the more, when he sees that a conscientious desire to benefit him is the mainspring of your action. I am aware that the dentist who does this will, by some, be called harsh and cruel. The unthinking, who love *humbug,* will prefer the Quack who promises to perform all operations "without pain;" but those who are desirable as patients will cheerfully submit to whatever you think necessary. It is as true in dentistry as elsewhere, that honesty is the best policy. From my own experience, I am prepared to say, that after explaining to your patients the necessity of thorough manipulation on your part, and a careful attention to the cleanliness of the teeth on their own, if they will not submit and follow your advice, your reputation and pocket will be better off without their patronage than with it.

You will not please all, and it is better to run the risk of displeasing ignorance and self-will, by doing your duty, than to degrade your profession, and hazard your reputation, by attempting to please unreasonable people.

* * * *

Sometimes no talking will induce children to submit to what you think necessary. In such cases, if your services are of *real* importance to them, you should not hesitate to resort to force. This should always be done in a kind, but resolute manner, and when you undertake it, never yield until you have accomplished your object. * *

As you look about you and see the changes that have been made in our art, you must not imagine that the world has stood still to witness the progress of our Profession. Our calling has but partaken of the spirit of the age. In the honoured field of medicine, in mineralogy, in astronomy, in geology, in mechanical invention, in agriculture, and in almost every other field of labour, there has been a great improvement. We are now living in the most remarkable age of the world. Every avenue to wealth and eminence is crowded; and every one is striving with his fellow, for distinction. Into this world of thought and labour you are about to enter; and you owe it to this College, that, like dutiful sons, you shall win laurels, to lay at the feet of your *Alma Mater*.

Aside from your own character, which must share the reputation of your Profession, you should seek to fill its ranks with educated men. It is doing a great injury to ourselves when we take the young men from the plough, the work-shop, or the counting-room, and, after a few months spent in our offices, send them forth to practise dentistry. The time has come when we should rely upon our Dental Colleges for the training of those who desire to enter our Profession in a legitimate way. Deny it as much as some will, our Colleges offer advantages for training the student, possessed by *no private office*. Private instruction in ours, as in the Medical Profession, is desirable; but it should only be given to students preparatory to College instruction.

There is no common trade which admits men to its ranks without discipline and training. Six months, or a year, with a shoemaker, may make a cobbler, but not a finished workman. You would not trust the appentice of six months to shoe your horse. You ask that the tailor shall be master of his work; and yet it is the custom of many dentists (and some from whom we should expect better things), to take young men, and those who can hardly get a living at anything else, and, after from six to eighteen months' drudgery in the office, send them out with letters of recommendation to defraud the public, and to degrade our calling.

In every profession which requires skill, there is great need of thorough training; and yet dentistry, which requires a knowledge of anatomy, chemistry, physiology, pathology, materia medica, therapeutics, and mechanics and the arts, is too often left to a few months' careless practice, or indifferent instruction, given in the intervals of business. Our Profession has not, as yet, given sufficient encouragement to Dental Colleges. Many of them are apt to speak of them as unnecessary. The same was once true of Medical Colleges ; but in all civilized communities they are more regarded as necessary for a thorough medical education.

We have learned to call those quacks who attempt to practise medicine without having passed through the discipline of a Medical College ; and may the day soon come when the community shall acknowledge, by the bitterness of experience, that it has learned the same wholesome lesson in regard to our Colleges and Profession. I am aware that many, who have not enjoyed this discipline, have, by their perseverance, worked themselves up to an enviable distinction, both in the Medical and Dental Professions ; but this only proves that those men possessed minds and energy sufficient to grapple with and overcome great difficulties. Many of them commenced when we had no Dental Colleges, and they have well earned their enviable distinction.

The necessity no longer exists for thus entering our Profession. The demand of the age is for the best ; and he who hopes for success must come to his calling thoroughly prepared. Without this the lawyer is a pettifogger, the craftsman a tinker, the doctor a quack, and need I add, that the man who writes "Dentist" after his name, without a thorough knowledge of his calling, combines them all,—a pettifogger, tinker, and quack.

ODONTOLOGICAL SOCIETY OF LONDON.

THE ordinary monthly meeting of this Society was held at 22 Soho square, on the evening of the 7th ult. Arnold Rogers, Esq., in the Chair.

Mr Tomes exhibited a small thumb mirror mounted on a piece of india rubber so as to be readily affixed to the thumb, or any finger of the hand. By placing the thumb, with the mirror attached, upon the palate, a bright light might be thrown upon teeth under operation.

Mr Childs exhibited his patent "Superheated Steam Vulcanizer," for the employmont of which the following instructions were given.

"The vulcanizing chamber, to be filled with an atmosphere of steam, requires to have poured or placed in it before the lid is screwed down, not more than a quarter of a pint of water. The gas is then to be lighted, and the heat brought up gradually by means of both the gas coils; when the heat is up to the desired temperature, then the small coil will be found sufficient to keep it at that degree of heat.

"The lid of the vulcanizing chamber must be always steam-tight when in use, this will prevent the escape of any smell—this is easily done by dusting some French chalk on that part upon which the lid is screwed down each time of vulcanizing.

"When the time necessary for hardening is completed, the apparatus must be allowed to cool down before opening the lid."

Some discussion of a conversational character followed Mr Child's explanation of his apparatus, in the course of which several members urged that gentleman to read a paper on the subject of his patent, but he respectfully declined, as he felt diffident in taking so prominent a part in the Society's proceedings.

Mr Mather then explained his Steam-Gas Soldering Apparatus, reference to which will be found in our report of the May meeting of the College of Dentists.

Several new members having been duly elected, the following paper by Mr Bridgeman, of Norwich, was read by the Secretary, in the unavoidable absence of the author:

LATERAL PRESSURE.

Lateral pressure is a term usually applied to certain results arising from an abnormal state of the human denture.

It is by no means restricted in its application, but is commonly assigned as a cause for any particular effect, either of crowding, or decay in the teeth, or any other deviation from the normal condition. But, although it is thus the assertion of a fact of common occurrence, it does not appear to have been made the subject of especial attention; nor, so far as I am aware of, has any attempt ever been made to point out its original source or manner of being produced, or of the circumstances under which it may arise.

The immediate action upon the teeth to which the appellation is commonly applied is merely the expression of some other and more remote force. There are three separate and distinct sources whence this force may be derived.

The first and most obvious is that arising from the force of growth—the *vis incrementi.*

The second is the *vis extensionis,* or pressure caused by the muscles of the cheeks and lips upon the *outer curve* of the arch, and by the expansion of the tongue in sucking, &c., *within* the arch.

And, thirdly, the *vis occlusionis,* or pressure caused by an imperfect bite.

In the first division, in which the pressure may arise from the growing teeth, its effects will of course be principally confined to certain periods only, and generally terminate with the maturity of the dentes sapientiæ, although in some few instances the retardation of particular teeth may cause it to be delayed for a much longer time. The crowns of the first permanent molars are the first to become affected by it; when these make their appearance through the gum, immediately beyond the posterior approximal surface of the second temporary molar, the bulbous protuberance of the latter projects over the transverse septum of the alveolus, and catches the crown of the rising tooth, causing it to recede as it progresses, and thus causes as much pressure as will be required to separate them to the required distance when fully formed.

That teeth so crushed together *do* sooner or later decay at the parts injured, I believe to be an undoubted fact, although we may not all agree as to the precise manner in which this decay takes place, or upon the agent by which it is immediately produced. The specimen No. 17 is a fair illustration of the effects of "the force of growth." Here the second molar, having no opportunity of moving forward out of the way of the dens sapientiæ, and the latter having become caught by the overhanging projecting enamel, has literally crushed its way into it, while the tooth has been kept down in its socket by the closure of the mouth and the antagonism of the upper teeth.

When the *posterior* approximal surface of the first or second molar is found to be decayed, it will generally extend down to the edge of the gums, or even below it; but not so with the *anterior*, as this is the *offending* surface, and the decay is principally confined to its most prominent part. It very generally, from being so well protected by enamel, escapes almost unscathed. The molars of the lower jaw are further calculated to cause this injurious pressure, by their line of growth being FORWARDS as well as *upwards* through the curvature of their fangs. This backward curving of the fangs of these teeth is doubtless owing to the growth of the maxillæ taking place simultaneously with their formation. The principal increase in the length of the lower jaw is known to occur between the furthest tooth formed and the ascending ramus; and as the periosteum has been found to be the secerner of bone, that portion of it lining the socket of the alveolus may be the source of the increasing thickness of bone between the fangs of these teeth, and thus separate them, while the crown of the tooth is carried forward with the increase in length of the maxilla.

Wherever one tooth in its eruptive stage has to come up between two others which are too close together, and have not left room for it, it will force its way either to its proper place, or to the inside or outside of the arch, according to circumstances, and any pressure upon the fang or fangs in the way will only lead to a part of the fangs being absorbed, while any portion of the crowns or the necks so circumstanced mostly ends in the decay of one or both.

But lateral pressure from this source must be strictly confined to the erection of the tooth in its natural position. Any pressure from malposition belongs to the following sections :

In the second division, lateral pressure is produced from the extension of the muscles of the cheeks and lips in distending the jaws, and also by the expansion of the tongue, as in sucking, &c. I have termed this the *vis extensionis*, because it exists principally only during the action of these organs.

We are all conversant with the effects of applied pressure upon a misplaced tooth, and constantly have opportunities of witnessing how readily a tooth may be moved in almost any direction, and that too with but a very small amount of force. We also frequently see the anterior portion of the upper denture rendered unnaturally prominent by sucking the finger or thumb, or by biting the lower lip, and therefore it may be fairly inferred, that should any other portions of the mouth under any particular circumstances be in a position to exert a pressure upon the teeth, it would be followed by corresponding results.

That such an effect really does occur, and that the form of the palate, in combination with the size and shape of the tongue, are the means of producing the particular form of denture by which they are accompanied, has to me long ceased to be a matter of doubt.

In his work on the 'Anatomy, Physiology, and Diseases of the Teeth,' in the chapter headed "OBSERVATIONS ON THE PRETENDED PREVENTION OF IRREGULARITY," pages 89 and 90, Professor Bell says—

"A favourable prognosis may, with tolerable certainty, be formed of the ultimate regularity of the teeth, as far as it depends upon the relative proportions between them and the maxillary bones, where the following circumstances are found to exist at the period when the second dentition commences.

"1st. If the maxillary arch be well formed, sufficiently expanded, and of a semicircular form rather than elliptical.

"2nd. If the temporary teeth, although broad, are a little separated from each other; especially if, having been originally somewhat crowded, they have been gradually acquiring more room during the last year or two; as this indicates a disposition in the jaws to expand."

These passages, with others of a similar kind, in which particular effects are alluded to without reference to any cause from which they would be likely to result, many years since excited my attention, and led to a closer examination of the subject, with a view to determine the primary source whence these deviations are produced.

The disposition of the jaws to expand, as alluded to in the above extract, being found to arise in *some* cases, but *not in every one,* was too significant a hint to be lost sight of; as it affords a palpable indication of the existence of *some peculiarity* which is NOT *common to all.* Therefore, when we find that the semicircular form of the denture—the form which gives rise to the separation of the temporary teeth by the "expansion of the jaws"—is invariably accompanied by a broad and shallow palate, this would naturally suggest itself as in some measure allied to the former peculiarity. But when it can be shown, that with this particular form of the palatal arch, the pressure of the tongue in sucking or in mastication is *capable* of producing the expansion of the jaws, and that when such an effect is absent the expansion of the jaws does *not* take place, it will scarcely be doubted but that they are really to each other in the relation of cause and effect.

It is, moreover, in the absence of the possibility of this pressure by the tongue within the arch, that *all cases of irregularity occur.*

If a lower incisor be removed on account of irregularity, or a bicuspid be removed from the upper jaw to make room for the cuspid, what is the power that fills up the space in the one instance and brings the cuspid into the vacancy in the other? It will not be the *force of growth* in the case of the lower incisor, because these teeth will be fully grown before such a proceeding would be deemed necessary. In the case of the cuspid, on a superficial view of the matter, it might be supposed to be capable of effecting it. But were the upper lip to be held up and prevented from touching the cuspid, I have no hesitation in saying it would never reach its intended destination without assistance. And, also, that were the tongue and the lower lip to be prevented from touching the lower incisors, these would never assume that degree of regularity they are found to do after such operation. An incisor projecting *inwards* in the lower is much sooner restored to position than an *outlying* one, and it is the same force, which, in the case of the permanent incisors coming up behind their temporary predecessors, pushes them forward into their places.

It is well known that the greatest amount of irregularity occurs at the angles of the mouth, in the neighbourhood of the cuspids.

It is just at this part that the pressure of the muscles of the face is exerted with its greatest force.

If the mouth be distended to its utmost, a considerable amount of pressure will be felt upon the teeth in this region, from the tension of the orbicularis oris and anterior portions of the buccinator. If the palate be broad and shallow, the more constant or more frequent action will have the preponderance, and the teeth will have become arranged at the sides and extremity of the tongue when at its greatest point of expansion, and the exterior pressure will then only have the effect of crushing the teeth together and causing them to decay. In the act of sucking, the tongue and the palate are as much dependent upon each other as are the two rows of teeth in eating. And when the tongue is pressed against the palate, either to form the vacuum for sucking, or to compress any portions of food, the very act of pressing it forcibly against the flat vault of the palate will cause it to expand, and to produce that expansion of the jaws, as the parts increase in size, which the foregoing passage alludes to as a favourable prognosis of the ultimate regularity of the teeth.

But in every case in which irregularities shall be found to occur, the palatal vault will as certainly be found to possess a corresponding peculiarity; for, whereas in the former case, the palate is broad and shallow, the palate processes of the superior maxillæ presenting a considerable area of horizontal surface, and gradually shelving off to the alveolus at an angle of about 45°—the tongue large and broad—the teeth comparatively small and broad, and wanting in boldness of outline, and rarely or never irregular in position;—in this case we shall find the palatal vault deep, narrow, and pointed; the tongue thick, narrow, and tapering; the alveolar ridge thick, prominent, and almost perpendicular; the teeth large and fully developed, thickly coated with enamel and bold in outline, but almost invariably irregular in position.

Under these conditions, in the act of sucking, which becomes extremely difficult and sometimes almost impossible in the case of a very deep and pointed arch, there will be NO *lateral expansion of the tongue.* All the effort will be required to reach the apex of the vault, and the tongue will be drawn up and thickened *vertically.* The action of the muscles of the cheeks and lips will be to press the teeth inwards, to cause them to assume an irregular line, and to overlap each other; the two upper maxillæ, in extreme cases, having the appearance of having been compressed together inwards.

These peculiarities of the oral cavity are strongly marked at an early age, and always prominently so, long before the period of that stage of dentition which first comes under the notice of the dentist ordinarily, and it affords a sure prognosis of the ultimate arrangement of the denture. I have made it the basis of my practice in the treatment of the growing mouth, invariably, for the last ten or twelve years, and I can assert with confidence I have never been disappointed in any of its anticipated results.

In the narrow and deep palate it is highly important to preserve the *crowns* of the *temporary teeth* in the mouth as long as possible, as close up to the period for their successors appearing through the gums as they can be retained without being in the way; and not to extract them without the most urgent grounds for so doing. It is more especially under these circumstances that the contraction of the jaws follows the removal of the teeth.

In the broad and shallow palate the action of the tongue overcomes this disposition to contraction, as is evidenced by the separation of the temporary teeth previous to their being shed. The *removal* of the temporary teeth *prematurely* is of less consequence, although, of course, to be avoided if possible; and beyond the removal of an aching tooth, perhaps, this form of mouth rarely needs any interference of the dentist, and certainly not on account of irregularity. At a later period, however, other effects begin to arise. The pressure from the cheek, which in the other case pressed the teeth *inwards*, now produces a degree of lateral pressure among the crowns of the teeth. Force applied upon the outer curve of an arch causes a thrust against its buttresses, as well as upon the sides of each of its component parts (if it be constructed in pieces), through the tendency of the curve to become flattened. Thus, the tension of the cheeks upon the outer curve of the denture produces a degree of lateral pressure mostly sufficient to ensure the decay of the first molars, the bicuspids, and probably the cuspids on their interstitial surfaces; and it is a rare circumstance to find the bicuspids perfect long after they have become fully developed.

In the narrow palate, the teeth placed irregularly are not unfrequently found to decay in a similar way at the parts where they are in contact: but another peculiarity is now to be looked for. The absence of pressure during the deposition of the enamel has a marked effect upon the character and outline of the tooth. Beginning to form simultaneously at a number of centres, the enamel continues to increase greatly in *thickness*, but fails to become united at the edges, or at the angles where three or more plates meet; hence the fissures on the grinding surfaces of the molars, and occasionally the pits on their buccal surfaces, which are so constantly found in this character of tooth. In the broad and shallow palate these circumstances *seldom, if ever,* occur. *The pressure of the tongue upon the alveolus* not only causes *its* plates to be formed *thinly*, but also produces a more *even* distribution of the enamel; which renders the tooth itself less bold in outline but more uniformly coated with this substance, and the *separate parts* thoroughly united at their edges.

It is most probable that it is the pressure to which the immature crown of the first molar is subject during the formation of the dentine, the deposition of the enamel and its progress through the alveolus, which causes this tooth so very generally to become decayed almost as soon as it is through the gums. When within the cell, its much greater size than the temporary ones causes the alveolus to form a considerable projection, which thus renders it more in the way of the contiguous parts. This is not the case with the *second* molar, because the increased width of the alveolus at the *first* molar forms a protecting screen. That the latter constitutes by very far the largest proportions of all the teeth requiring removal is generally admitted, and by these teeth mostly decaying in many places simultaneously, there can be little doubt but that the *whole crown* of the tooth has been subject to some detrimental influence in the early stage of its being formed; and, although it may be possible that the effect may arise constitutionally or from irritation or some other cause connected with dentition GENERALLY, I am more disposed to attribute it to this cause—to the imperfect condition of the organic basis of the dentine. If the *first* molar is in some measure the analogue of the third molar—the dens sapientiæ—it stands in pretty near the same relation to the deciduous teeth that the latter does to the second set. And we know how very generally the dens sapientiæ, when cut late, or even at the accustomed age, is in a similar condition—soft, friable, and rapidly decaying—but which is not the case when the early removal of the first molar has caused it to make its appearance within a very short time after the second molar. Its more rapid growth, and the absence of any particular pressure from confinement within its cell, are correlative with its being a healthy and well-formed tooth; therefore, there is every reason to suppose that its being in an imperfect state is the result of pressure during its protracted formation, and that the first molar may be similarly affected.

In the correction of irregularity by the expansion of the arch (and which is extremely easy by pressure applied *within* the arch), it becomes a question to what extent the extension can be carried with safety? for if the teeth be placed much within the influence of lateral pressure from the same cause which displaced them in the first instance, we shall have another serious evil in their soon becoming decayed; but the amount of extension can only be judged of by the proportions of the various organs. We have hitherto contrasted only the extreme forms of the wide and narrow dentures. In practice they will be found merging into each other almost imperceptibly, but in every case with proportionate results, according to the peculiarity of formation.

In the third and remaining source of lateral pressure, its occurrence may be attributed more especially to accidental circumstances preventing the proper antagonism of the teeth.

In a perfect bite, the grinding edges of the teeth present everywhere a *series of inclined planes.* This is especially apparent in the bicuspids, the point of one fitting in between the oblique sides of the two opposed to it. Were there to be but these three teeth left in a mouth, a lower bicuspid and two above, the single tooth would soon *wedge* open the others and pass between until stopped by the gums. But, instead of two bicuspids only, were the first molar and the cuspid also remaining, or even more than these, the tendency of the *single wedge* to effect their separation would set up an amount of lateral pressure among them proportionate to the force with which the jaws were occluded.

Cases of this kind are of very common occurrence; not, perhaps, with only a single lower bicuspid remaining, but with such an arrangement, through the loss of the molars, that similar results are produced —that two or more teeth are thus forcibly pressed together by the oblique sides of their opponents.

The proper antagonism of the teeth I hold to be of the very utmost importance, and in regulating the mouths of children to be of far more consequence than the actual number of teeth remaining, provided the symmetry of the anterior portion of the denture be not interfered with.

In thus noticing the several sources of lateral pressure, the short limits of a paper like the present necessitate its being confined to a mere summary of the general features; to have particularised many of the various peculiarities assumed under the different forms would have added greatly to its length and rendered it too voluminous, although it might have tended materially to strengthen the position in regard to the views I have expressed. This is in some measure to be regretted, for in breaking fresh ground and treading a new path, every possible advantage is desirable at the outset to secure the most favourable and impressive appearance. Still, I trust, sufficient has been pointed out to show the importance of the subject, and to obtain for it that consideration it deserves.

A short discussion followed Mr Bridgeman's paper, and after a vote of thanks had been accorded to that gentleman, the meeting adjourned.

TESTIMONIAL TO MR MACLEAN.—The whole profession of Dublin, its most eminent members at their head, have just paid a very high compliment to Mr Maclean, who, after a long and honourable career of usefulness as a dentist, has just retired from practice, on account of advancing years and impaired health. The address, and Mr Maclean's answer, which were both made public at a meeting of the members of the Colleges of Physicians and Surgeons held on the 25th ult., are highly honourable to both parties.

DR CHAPIN A. HARRIS.—This distinguished and indefatigable dentist is about adding another to his valuable published works on Dental Science: subject—'The Pathology of the Mouth.' The work will be illustrated by numerous coloured plates, and will doubtless prove an excellent addition to the standard literature of our Profession.

COLLEGE OF DENTISTS OF ENGLAND.

LECTURES ON THE MEDICAL HISTORY AND TREATMENT OF DISEASES OF THE TEETH, AND THEIR ADJACENT STRUCTURES.

By BENJAMIN W. RICHARDSON, M.D.,

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LECTURE VII.

[*Delivered on January* 11*th*, 1859.]

ON PURULENT AFFECTIONS OF THE GUMS AND ADJACENT STRUCTURES.

Mr President and Gentlemen.

There are few questions in Pathology more involved in obscurity than certain ones relating to that pathological condition, marked by the development in the body of a specific fluid known as pus, and designated by the Medical world as purulent disease. At the same time there is no condition more commonly evident in practice, and concerning which more has been written. Under so many circumstances is the formation of pus a leading process, that the mind of the practitioner is led almost to look upon such formation as a normal occurrence, incident simply to antecedent mischief.

A wound is inflicted into soft structure; the wound bleeds for a time; the bleeding stops, but the edges of the wound not brought together, and not healing by what is called the first intention, there is soon produced in the open wound a free secretion, very simple in composition, resembling ordinary mucus in its general characters, and serving a protective purpose; shielding, in fact, the open wound from air, and by such conservation arresting that ultimate resolution in death known as the putrefactive change. Or a foreign body is lodged in a deep-seated part, a disintegration of tissue is the result, a cavity forms, and on the surface of that cavity there is set up an analogous change; a simple fluid is produced, and lines the inner wall of the cavity. A short time elapses, and in either case this simple fluid is transformed into the purulent secretion, into pus.

The nature of this transformation is the point most obscure. Like the first formed and simple fluid, the new product can have but one source: it must be derived from blood; the vessels supplying the locality in which the pus is presented must needs yield the material, for were this not the fact the formation could not be continuous. The secretion (for, for the moment, we may call pus a secretion) must be eliminated in the capillary system of vessels. A section of capillary surface has taken on glandular function, and a secreted fluid is the consequence.

The analogy which exists between the purulent secretion and blood itself further establishes the source of the secretion. The pus, like blood, contains albumen, contains a body having some resemblances to fibrine, contains water, contains corpuscles resembling intimately the white blood cell; it contains fat, contains salts common to blood, as carbonates, phosphates, and chlorides, especially chloride of sodium; contains sometimes iron, and to complete the parity, possesses in the normal state an alkaline reaction. What definition shall we give to a fluid so singularly constituted, let us venture on a bold description; let us express in a sentence a whole book in disease; let us call pus, *modified blood*, and purulent exudation modified *hœmorrhage.*

We must not, however, in this generalizing spirit be led to the opinion that pus is exuded from blood as pus. We protect ourselves from this error in again representing the pus-secreting surface as a glandular surface; and in stating that the blood, leaving its channels as blood, is transformed into the purulent fluid at the suppurating part.

At the same time we must not be led into the error of presuming that the formation of pus is an act purely local; and that blood out of which pus is produced is normal in all its characters.

These views would, either one or other, be equally extreme; nor is it easy, even admitting this, to indicate the precise relationship which obtains between disordered conditions of blood and affections marked by purulent formations. It is, perhaps, the nearest approach to the truth that can be made in the present state of our knowledge to say;

That there are conditions of blood in which, irrespective of local injury or disease, the tendency to purulent transformation is broadly marked.

That in normal states of blood there are local changes which are capable, by an effect exercised on the blood supplied simply to the local part itself, of exciting a purulent secretion in such part, the compounds of which secretion are derived from blood.

That there are certain states of body in which there is general disposition of blood to purulent secretion, and at the same time in the body certain local points in which the formation of purulent secretion is largely favoured: or, to put the whole question into one proposition, that pus cannot be produced without blood as the supplying food, and organized structure as the transforming medium.

An illustration of the first of these conditions is given in the instance of what is called feruncular epidemic, *i.e.* where a disposition to the formation of pus, in form of abscess or boil, extends over a whole country. Here the general demonstration of the fact, and the variation of place in the bodies of affected persons, proves the mode of production to be general, and the local affection to be mainly accidental.

An illustration of the second of the conditions named is supplied in the instance of simple suppuration of a wound in a healthy person.

An illustration of the third variety is offered in cases where, in unhealthy states of body, the suppurative tendency is developed in the immediate vicinity of a portion of diseased structure; as when, during depraved health, abscess and ulcerative suppuration occur around teeth which are necrosed or carious.

Now that I have enumerated and illustrated these three relationships between the blood and the secretion produced out of it called pus, I have said all, pretty well, that is really known. I could certainly lead you into very refined pathological argument on these relationships; but then I should be leading you from the practical teachings of these lectures for no more desirable a purpose than display of erudition, and this too on topics which could not, by all the erudition in the world, be fully explained at the present time. I shall therefore leave the points I have laid down as a curt summary of what is known; adding only one more observation bearing on what has preceded.

While we cannot trace out the nature of that condition of the blood which gives rise to purulent formations, we are informed by observation of the external conditions which foster it. We have learnt that the pus-producing disposition is an indication of deterioration of blood. We see that when the system is enfeebled, whether by diathesis hereditarily supplied, as by the strumous diathesis—whether by epidemic influences—or whether by deprivation of nitrogenous food or the inhalation of bad air—that under these circumstances the tendency to purulent deposit in local structures is marked, and that, in extreme instances of the kind named, the act of suppuration may take its absolute origin from blood thus depraved.

Hence we have reduced almost to a principle in medicine, the saying that suppurative tendency is a sign of an impaired or vitiated nutrition. Hence also we reason in speculative argument, that pus is blood transformed into a lower form of organization, and we adduce in evidence of this view, that the purulent fluid is incapable of organic construction, and that animals in which the respiration, the circulation, and the animal temperature are more than ordinarily active, the formation of pus, even in an open wound, is an occurrence almost unknown.

Formation of purulent fluid may occur in a variety of animal structures. Yet there seems to be a law on this point; viz., that pus only is produced in the presence of a nitrogenous structure.

Thus pus is formed under skin, in the great cavities, as in the chest or abdomen; in the centres of organs, as the liver, or kidney, or lung; in lymphatic glands, constituting abscess or boil, in or upon mucous membrane; or in firmer structures, as in bone. It would be more difficult, in short, to tell where pus will not form, than where it will.

When the purulent formation has commenced moreover, and is continued, the force with which it is secreted is very considerable. This is best shown when the fluid formed is hemmed in on all sides, as when it is formed in a gland, or in a bone cavity like the antrum of Highmore. Increasing in such position from day to day, and exerting a steady and even pressure on surrounding parts, its physical influence is astounding. It will force through flesh, force through bone, burrow under muscle, and disintegrate gland.

The old writers in physic noticed that pus, in exerting its pressure, always seemed to make its way towards the surface of the body, as if, argued they, to discharge itself and be gone. The general observation is mainly correct, but the argument based on the observation is shaky. Pus confined in a shut cavity, and increasing in quantity by addition from the blood, must exert an equal pressure on all opposing surfaces. But as in a cavity there may be certain part of its walls in which the resistance is least, so there will the effect of the pressure be soonest manifested. Hence, under the cutaneous surface of the body an abscess points ordinarily outwards, because, in consequence of the equal pressure from within, resistance is least offered at this particular spot.

The symptoms indicative of purulent formation are, ordinarily, constitutional as well as local. According to common observation the general symptoms appear to take precedence, and hence the local symptoms are often referred to the general symptoms, as having in the general symptoms an origin or cause. This supposition is not truly correct, nay, it may be incorrect altogether. It may be that, in many instances, the general symptoms are indications of the systemic recognition of a local but not fully developed lesion. Or it may be again, that the constitutional disturbance is coincident with the local, both having a common origin in one common source, as the introduction of poison into the blood, or the effect of a wound in which restoration by the first intention is not the fact.

I speak now of general symptoms accompanying the purulent form of disease in its acute demonstration. There are other symptoms of the systemic order which follow the fact of purulent formation, and are solely dependant upon it for their existence. These two classes are widely different in character, and deserve special notice.

The symptoms accompanying the local manifestation of pus in its acute form are those of active febrile excitement. The patient is first depressed, then he is cold, next he shivers, and soon complains of pain in his limbs and back. The shivering, if slight, is designated simply as a shivering fit; if it is prolonged and severe it is called a rigor. The intensity of the rigor is, as a general rule, an indication of the extent of the forthcoming evils; if the rigor is well marked and severe, the sequelæ are correspondingly important. To this rule, however, many exceptions will occur to the practitioner, all based on individual susceptibility and temperament. Thus, in full sanguineous men, a trifling rigor may be followed by the most alarming local demonstration and purulent secretion; while, in hysterical women and nervous, irritable men, a severe rigor may be the precursor of the most temporary local change. In such individuals as I have thus specified last the development even of that purulent affection known as gum-boil is not unfrequently preceded by systemic symptoms which might in others stand for abscess of a visceral organ.

The subsidence of the first class of the general symptoms marks ordinarily the period when the local symptoms commence. Hence, as the systemic symptoms come on first, it is not always that one can predict the local lesion which shall follow them. With the development of pus a continued irritative fever is established, which, modified in degree, is marked by special signs, by loaded and white tongue, thirst, heat of skin, and prostration. If the pus is formed in the centre of a structure and is confined, the irritative febrile state first dependant on the local derangement is sustained by the irritation set up by the pressure from within, and does not cease until the pus finds its way to the surface and is discharged from the body. If the pus is on an open surface, the acute symptoms pass away on the free development of the purulent secretion.

In the majority of cases, after pus has formed and has found an escape or vent, the acute systemic signs disappear and convalescence is the result. But to this rule, again, the exceptions are many; the character of the symptoms being only changed, and convalescence being retarded or prevented altogether.

If, for example, there be at the root of the local mischief some cause, in shape of a foreign body, the purulent deposit may be sustained and the discharge may continue. Now the train of systemic signs takes on a new form. There is no persistent febrile excitement, but depression with intermissions of excitement, hectic fits, as the common phrase goes; now the patient runs the hazard, in extreme cases, of succumbing from absolute excess of secretion, the purulent exudation is a modified hæmorrhage, and the result, if continued, is wasting and death.

If, again, to take another example, the purulent secretion, after having found vent from the system, is sustained by pre-existing depravation of blood, the same result in a modified way is the great fact. We said in a previous lecture that loss of blood feeds on the loss, and that the more the system loses of its blood, and the longer it loses its blood, the longer is the tendency to hæmorrhage perpetuated. The same rule obtains in regard to the formation and the elimination of pus; the greater the amount of secretion, the greater the tendency to exudation. The disease feeds on itself.

Thus it happens that in the half-fed children of the poor, and in the strumous children of the rich and poor alike, the difficulties in arresting purulent exudation are very great. The cancrum oris of poor children attended with the ulcerated mouth; or the purulent gum attended by the necrosed or carious tooth, are classes of cases of the description here given, the mention of which will recall all the circumstances which have been now detailed.

There are yet two other phases in the symptoms succeeding purulent exudation, to which attention must needs be called. It does now and then occur that purulent matter, effused into some firm structure, finds no vent, or but an imperfect one, and, being confined in the part into which it is effused, undergoes transformation, and becomes putrid. This result is most common when the deposit of pus takes place in the neighbourhood of the bowels, but it may occur in other positions. There is then a further result, the putrid purulent matter becomes a veritable poison. In these instances, the purulent decomposing matter yields an alkaline substance, which, absorbed into the system, excites all the characteristic signs of typhoid fever; not the febrile excitement, understand, referred to as accompanying the development of pus, but a low fever, having all the characteristics of a typhoid, with dry and dark tongue, ammoniacal breath, petechial rash, delirium, and the tendency, too often demonstrated in the reality, to death by coma.

The last phase of disease resulting from purulent deposit consists in the development of the systemic affection known as pyæmia. This affection is assumed to be produced by the direct absorption of pus into the circulation. Many experiments have been made to imitate this affection by injecting pus into the veins of animals, and it is to be gathered from an unbiassed view of the whole of these experiments, that by this operation a series of symptoms closely resembling those of pyæmia may be excited. At the same time, the experiments thus instituted do not prove the theory of the absorption of purulent matter from one part of the body to another, but rather a disposition of the body to the formation of pus in different parts of the solid structures at the same time.

The symptoms which attend the disease are those of the low fever type, and I may add that the symptoms, in the majority of cases, end fatally. Sometimes the symptoms are prolonged, and the prostration which ensues is marked by profuse colliquative sweats, with febrile intermissions. But, as I say, death is the ordinary result; and after death deposits of purulent matter are to be found in a variety of parts, as in the structure of the lungs and in other soft and vascular organs.

This disease, pyæmia, is rarely seen in private practice. It is the deathly exhibition of a vile hygeine, to common hospitals in crowded localities, or to hospitals themselves crowded with patients. There are some foul hospitals in these of her Majesty's dominions from which pyæmia is rarely absent, and in which it breaks out in such awful virulence that every patient who comes under the surgeon's knife is, for the time, a doomed man.

Summing up, then, the general symptoms which are common to purulent formations, we see them divided into two groups:—into a primary group, preceding and accompanying the purulent formation, and consisting of febrile excitement, more or less tonic in character; and, into a secondary group, in which the symptoms may assume three phases; simple exhaustion from absolute excretion of pus, and attendant pain, marked by hectic and gradual prostration; typhoid symptoms from decomposition of pus and absorption into the blood of one of the alkaline products of such decomposition; and, lastly, pyæmia, or the extensive developments of purulent deposits in various parts of the tissues, and death with colliquative flux and rapid disintegration of tissue.

The local symptoms which attend the formation of pus, are, like the general, of two kinds, the active and the passive. The active are tolerably uniform in character. They consist, first, of tension and throbbing which eventually merges into severe and lanceolating pain. The pain is, of necessity, greatly modified according to the part in which the pus is being produced. If the part is richly supplied with sensitive nerves, the pain is intensely severe, and *vice versâ.*

There is also increased heat in the part, and there is swelling.

None of these symptoms, as a general rule, disappear until such time as the pus finds vent Then they disappear as by a charm, and the patient sleeps in the luxury of a relief which has to be felt to be appreciated.

Occasionally, however, as we have seen, the symptoms do not terminate by discharge of the purulent fluid. The purulent secretion is confined in its position. Under these circumstances, the more active symptoms may disappear, such as the redness and the throbbing pain; and there may be left only the swelling and the passive pain due to tension from the pressure of the fluid confined in a closed cavity.

When pus has found its way to a free surface, and can escape readily, the local symptoms, now rendered passive in character, are modified according to circumstance. If the discharge be perfectly unimpeded, there is no great demonstration of pain, but there is change of tissue at the discharging point. The purulent matter being from a wide surface as over a large patch of the cutaneous surface, or mucous surface, the true lining structure is removed, or as the common saying goes, is ulcerated, and the pus is spread over the ulcerated cavity. Beneath the pus is a reddened surface raised into little eminences, and called the granulating surface. If the pus is from a cavity, and is discharging by an opening at some outer part, the lining surface of the cavity from which the fluid comes has the same granulated character throughout.

The pus itself changes materially in its physical qualities and in its appearance. In its healthiest form, or when according to set phraseology, it exists as laudable pus, it is of a yellowish colour, heavy, having a specific gravity approaching that of blood, viz. 1·030 to 1·040, a freedom from any streak or stain, and no odour. In other cases, the pus is tinged by the colouring principle of the blood, and is then of reddish cast. In a third class of cases the pus is from the first, or after a time, of watery, whey-like consistency—ichorous pus, so called by the term makers.

Lastly, the pus may be putrid, when it is of dark colour, thin fluidity, and disgustingly offensive to the smell, being charged with ammonia in the form of hydrosulphate.

The appearances presented by the purulent secretion should be always carefully noted, since they afford, often, a clue to certain constitutional peculiarities upon the which the result of the case may mainly turn. Thus the fine clear, yellow, inodorous purulent secretion affords indication that all's well within—that the local mischief is healing kindly. The purulent matter which is blood-stained indicates, if the stain is not simply accidental, that there is a readiness on the part of the blood to effuse from its vessels. The watery secretion points out that the systemic forces are low, and the putrid secretion forewarns the practitioner that, if free elimination is permitted, the typhoid poison symptoms will not remain long in the rear.

From the consideration of the preceding particulars regarding the formation of pus, and the general and local symptoms which attend such formation, let us turn now to the narration of those forms of purulent disease which are of practical moment to the practitioner of dentistry.

In regard to the teeth and the structures adjoining them, purulent disorder has the following relationships.

1. To abscess of the antrum maxillare.
2. To abscess of the dental pulp.
3. To abscess in dentine.
4. To purulent deposit around the tooth in alveolus.
5. To purulent secretion on the mucous surface of the buccal cavity.
6. Abscess beneath or near the jaw externally.

The first, and perhaps, taking it all in all, the most serious of the purulent affections classified above is that accumulation of purulent matter in the antrum of Highmore of the superior maxillary bone, known, ordinarily, under the term abscess of the antrum.

This disease is less common amongst youths and children than amongst adults. It is not, at first, a disease very easily diagnosed, and even in late stages it sometimes presents many and perplexing difficulties in the way of symptom.

The causes of the affection are at least three, possibly more; viz., obliteration of the duct leading from the antrum to the nose, and accumulation of serous secretion in the cavity and subsequent irritation; secondly, the presence of the fang of a carious tooth; thirdly, injury done to the bony wall of the cavity. To these causes constitutional diathesis must always be superadded.

The formation of matter in the antrum of Highmore is preceded by inflammation, and this inflammation is not in the bone structure but in a delicate membrane of fibrous texture which lines the cavity throughout and supports the vessels and nerves with which the bone beneath is supplied. The symptoms of abscess of the antrum were very carefully studied by Mr Hunter, and were described by him in a manner which has never been surpassed. The pain produced in the early stages of the disorder is very often mistaken for toothache, and this is specially the case (I am following now Mr Hunter's faithful history) if there be a bad tooth on that side. In these cases, however, as the same author acutely observes, the nose is more affected than is common in simple toothache. The sensation in the nose is described by patients as of fulness and tenderness within and in the affected half. There is a desire to blow the nose frequently, but this impulse, if followed very much, intensifies the pain, and throws back the pain upon the cheek. The pain extends to the eye and to the frontal sinus causing in the forehead what is known as frontal headache. Preceding, or at least accompanying these indications, there will be present, in greater or lesser intensity, those general signs of febrile excitement which have already been described.

After a time the physical local signs of the disorder are made manifest. There is first a red blush of the cheek almost in the centre, and this is followed by hardness and swelling. As the swelling progresses the acute pain may subside into a permanent suffering wanting in intensity but made up in peristency. The cheek is, as it were, bursting from within, surrounding parts are displaced, the one half side of the nose is flattened up, the movement of the upper lip is impeded, the orifice of the mouth may in very bad cases be altered in shape, while the eye may be so pressed on as to suffer serious injury. These are the symptoms in their extreme manifestation. Dr Harris has pointed out that when the nose is forcibly blowed, or when the head reclines on the opposite to the affected side, there may be discharge of sanious or purulent matter from the nose, and this he considers when present as a valuable sign of the disease. I do not find this occurrence noticed by other writers, but on the contrary, I find most writers stating that in almost all cases of accumulation of fluid in the antrum, the passage leading from it to the nasal cavity is filled up. However, I bring forward Dr Harris's statement out of respect to him as one of our best dental authorities.

There are two affections with which this purulent affection of the antrum may be confounded; viz., simple increased secretion of serous fluid in the antrum, and malignant tumour. The first of these affections cannot, without operation, be distinguished from the purulent formation, and it may even vie with the purulent affection in the extent of disfigurement or pain produced by it.

The second, viz., malignant tumour, may be, with care, diagnosed by certain signs peculiar to itself. These are, slower progress of symptom, pain at first intermittent and not referred specially to any one point, a diffuse swelling of the cheek rather than at one concentrated point, an absence of relief by effusion on making an opening into the antrum, and, lastly, the evidence of cancerous diathesis, as derived from the previous and present history of the affected person.

I would remark at the same time that these points of diagnosis are not always certain. I remember seeing a case in which pus being presumed to be present in the antrum a molar was extracted, the antrum was perforated through the alveolar cavity and a small quantity of pus did escape. The opening was kept free and there was for many weeks an effusion of fluid supposed to be thin or sanious pus. But recovery did not take place, and the after symptoms gave out the tale that the disease in the antrum was of malignant type. Time is often, in fine, the only reference in cases such as these.

When pus has formed in the antrum and has been removed by operation, and when a free opening has been made for the exit of more secretion as it may form, it is astonishing how readily and happily the parts which have been disfigured reassume their normal shape. I had the opportunity not long since of seeing, with our excellent President, a case in which this fact was peculiarly well marked. A woman, in whom abscess of the antrum on the left side had produced a degree of disfigurement rarely witnessed, was relieved of her burthen by removal of a molar tooth and by retention of a free opening. Mr Matthews had the gratification of seeing this disfigurement gradually pass away, and by this time his patient has regained her pristine beauty, the which, having never been in excess, is to her all the more valuable.

When there is accumulation of purulent fluid in the antrum the pressure which it exerts is made towards exit in two directions, viz., towards the external wall of the cavity, *i. e.* toward the cheek, or laterally, *i. e.* through the bony wall into the nose. However, it often happens, unfortunately, that the fluid accumulates and the parts around continue obstinately unyeilding.

Abscess of the dental pulp, is a form of purulent affection, but indifferently recognised by the distinguished Hunter. The occurrence of this kind of abscess is certainly rare, nor do I think that, as a purely localised disease, it has as yet been fully described. Mr Fox seems to have referred to it under the term spina ventosa. He says, " Spina ventosa is the term usually given to that species of tumour in bone which is originally an abscess forming in the centre, the ulcerative process removing the bone from the inside while there is a correspondent increase on the outside ; " and other authors, following Mr Fox, have continued to use this term in a similar way. Mr Bell long since pointed out the folly of this nomenclature, and the folly truly is sinful. The term spina ventosa was first applied by the Arabian writers to express a peculiar swelling of the bone ; spina to express a pain resembling the pricking of thorns, and ventosa to indicate that the swelling, under the touch, conveyed the impression of a bag filled with air. A windbag the whole affair certainly is, and specially so when applied to the abscess of the dental cavity. It is probable that the term spina ventosa was originally applied to the disease of joint known commonly as white-swelling, or it may have meant necrosis of bone with purulent secretion in the medullary canal ; anyway the term is ridiculously inapplicable to abscess of the dental cavity, and should be driven out of our literature forthwith, without hesitation.

True purulent disease of the dental pulp seems to occur in an acute and chronic form. In its acute mainfestation it is the upshot of inflammation, which inflammation, as it shall arise from accident, from exposure by caries, or from constitutional disorder, may partake, as Mr Tomes has well pointed out, of a local or a general type. If the inflammation of the vascular pulp occur in a closed cavity, *i. e.* in an uninjured or rather unbroken tooth, the inflammation and the resulting suppuration is general. If the pulp structure be exposed at any point the inflammation and the resulting suppuration is local, the product of the inflammation having, in a word, the facility of making its escape as it forms. It is of moment to remember these two divisions, since the symptoms and ultimate results are widely different in the two classes of cases. In the general suppurative disorder, there are developed all the acute signs of a vehement inflammatory attack, accompanied by intense pain, and febrile excitement and even severe rigor. Here, as the purulent secretion forces its way, it finds in the opening at the fang of the tooth the most yielding point; here, therefore, the matter, if it escape at all, does escape; thus it finds its way into the alveolus, and alveolar abscess is the next apparent complication. The tooth, now deprived of its vascular supply from both within and without, dies forthwith. - trace out here the extreme end of a case of general suppuration within the dental cavity.

In the local form of suppuration of the pulp, on the other hand, there may be pain, and the pain may be very great when irritation of the pulp is made; but as the purulent matter is discharged as it is formed all the severe symptoms disappear presently, and are not seriously illustrated unless some cunning operator, in the zeal of his skill, turns a stopcock on the discharge by filling the carious cavity with a firm plug.

I should be neglecting an interesting subject, were I in this place to pass over without notice a form of disease of the dental pulp, called by Dr Harris, and first described by him "spontaneous disorganisation." In these cases the pulp structure is slowly destroyed by a process independent of inflammation, and its place supplied by a fluid matter of dark brown colour, of little odour and having the consistence of cream. In these instances, several of which appear to have been presented to Dr Harris, the sockets do not seem to be affected, but the teeth assume a "dull, brownish, or bluish brownish appearance." and the gums over the alveolar border of the affected teeth have a pale greyish-purple colour, without softening or congestion. The persons in whom this affection occurs are usually, according to the learned author who first described this disorder, under twenty years of age, and of pale or sanguineous cast. The affection, moreover, is not often confined to one tooth, but "occurs simultaneously in corresponding teeth." It is confined principally "to the incisors and cuspidati, and sound teeth appear to be as subject to it as those which are carious."

Dr Harris very correctly opines that the disease in these examples is the result of constitutional mal-condition. This must be so, but the condition or diathesis requires to be more fully made out. Is the systematic cause struma? Is it poison; the poison of syphilis, or mercury, or lead?

The formation of purulent matter in the structure of the dentine has been asserted as possible by Professor Bell, who adduces a case of the kind in proof. Mr Tomes has also shown the same occurrence in the tusk of the elephant. But as this affection is to the last degree rare, I dismiss it with this passing recognition.

The presence of purulent secretion in the alveolar cavity may be accounted for in different cases, in many different ways. We have seen one mode by which this result is brought about. We have seen that purulent matter in the cavity of a tooth may force its way through the openings in the fangs of the tooth into the alveolus; thus exuded, the fluid wedges its way towards the gum and breaking up the alveolar connection sets the tooth free in the socket, and of necessity, by cutting off nutrition from without and within, causes death to the whole structure. But, as I have said, there are many other sources of alveolar abscess, and these must be known.

Amongst these remaining causes may be mentioned—1st. Injury and inflammation of the alveolus itself with subsequent necrosis. Here the mischief may not destroy the tooth, if the nutrient vessels supplying the central part of the tooth are not involved. 2nd. Injury, or other accident, leading to necrosis of tooth and subsequent destruction of the alveolar connection, and purulent infiltration. 3rd. Disease in the fang of a tooth, and the presence of foreign bodies. 4th. Inflammation of the connecting membrane as the result of poison in the blood, as the poison of small-pox and mercury.

The symptoms of alveolar abscess, known better by the vulgar as symptoms of gum boil, are moderate or severe, according to the cause. They are of two kinds, general or local, as I have described already. If the purulent formation have its origin in the dental pulp and the abscess become alveolar by an absolute forcing of the excreted fluid into the alveolar cavity, no symptoms are more severe than those which attend this alveolar affection. The pain deep, pulsating, lanceolating, bursting, is not easily described in words, nor is the relief which is obtained as the pus escapes of ready description. But when the purulent formation is confined to the alveolus, the pain, though still acute and throbbing, is more superficial and more bearable.

In either case the presenting matter, wedging its way by the side of the alveolus and tooth, and finding itself opposed by the overlapping gum, pushes that yielding structure before it, and produces what is known as gum boil. The distention of gum gives rise to new irritation, which is not removed until the gum gives way.

If an operation for setting at liberty the purulent matter is not performed, the matter discharges at last of itself by one of two ways, either by an ulcerative opening through the gum structure, or by separation between the gum and the tooth which it encloses. If the latter result obtains, the passage for the discharge remains free and easy, for as Hunter well observed, the gum never again becomes permanent to the tooth; if the matter exude through broken gum, the wound made may heal when pressure is removed, and the old miseries may be revived.

The practitioner may here learn an excellent lesson in reference to the mode of operating for gum boil. The proper plan being, not to pass through the gum with the scalpel, but to separate gum and tooth with the gum lancet as in the simple act of scarification previous to extraction.

The symptoms I have here described are those of acute abscess in the alveolus. But there is another and chronic form of the disease, in which pus, formed at first with some pain round or near a diseased tooth, remains and extends involving other teeth without any very great manifestation of suffering, but producing much discomfort and a secondary affection of the gum important in its way.

It will be remembered that when I was treating of hæmorrhage and the hæmorrhagic diathesis, I explained that there was a variety of hæmorrhage arising simply from disease of the vessels of a part and not from any disordered condition of the blood itself. Now this condition of vessel, and this variety of hæmorrhage is common to the chronic purulent affection to which reference is at this time being made. The gum, imperfectly nourished, becomes spongy in texture, bleeds on the slightest provocation, and presents all the local appearances of the true scurvy gum. This kind of gum is, indeed, often most improperly called scurvy gum, and treatment is adopted for it which for rank empiricism of principle has nothing for its equal.

Mr Humby has recently done me the kindness to show me a patient in whom chronic purulent disease of the alveolus involving the gum, as I have just explained, existed for a long time and presented at last many points of great practical value.

The patient in this case was one Edward Chester, a youth of eighteen years of age, by business, a clerk in a warehouse. He came before Mr Humby at the Royal General Dispensary. He stated that in early life he suffered from small-pox, and at nine years of age he had rheumatic fever. His father, a dissolute man, died many years ago, and a brother and a sister have also died. The first symptoms of tooth affection commenced when he was ten years of age. His teeth became dark in colour, brittle, and carious. He did not suffer much from toothache, but occasionally this was a symptom. At this time, and since, his general health has been good, but the gradual disorganisation of the teeth progressed, and in time all the teeth in both jaws were involved excepting the upper bicuspid on the left side, the second upper molars on both sides, the second lower bicuspid on the left side, and the first lower bicuspid on the right side. After seven years, *i. e.*, when the lad was entering in his eighteenth year, purulent matter began to form around the diseased teeth, and the gums became soft, spongy, and so vascular that they bled on the merest touch. This condition constituted what was considered to be the scurvy gum and the patient seeing in the window of a dog doctor the history of a famous lotion invented by the said doctor for the scurvy gum, went in to be cured by a lotion and came out to have his bad teeth as effectually finished off by art, as any dog doctor, aided by strong sulphuric acid, could devise. The lotion applied to the gums by this ingenious charlatan contained, in fact, the acid I have named. In its application to the gums it gave great pain; it set the teeth on edge, it turned the gums of a blue colour, and it removed the enamel from all the teeth with which it came in contact, so effectually, that the mouth may be virtually considered as destroyed, since any endeavour to save the majority of the teeth is bereft of any chance of success. The cast of the mouth of this youth is now before the members.

In the case here recorded, we have an illustration of purulent disease giving rise to symptoms closely resembling those which characterise true scurvy gum.

There is yet another class of cases in which the true scorbutic disorder sets up purulent deposit. In the case of a patient recently under my care for purpura, bleeding spongy gum was one of the marked symptoms. When this symptom was most marked, the alveolus became affected, and purulent fluid soon separated several of the teeth from their alveolar connection. Under general treatment the purpuric symptoms subsided and the teeth were saved. This satisfactory result, which I have seen before, is attributable to the fact that the tooth continues to receive its central nutritive supply. I believe, however, that in after years, teeth which have been separated from their alveolar connection are much more ready to decay under external influences, and they sometimes loosen and fall out with comparative suddenness and without expectation.

We have several times had before us the question of the influence of the eruptive diseases on dental affections. I recal this point merely to note that in small-pox, exfoliation of the alveolus and consequent purulent formation is an occasional result.

In past days the same often happened from the injudicious use of mercury, and one shudders to read the quiet stories of Astruc, about men who were fumigated into purulent puddings, whose teeth dropped in a row at a time, and whose decomposing gums and jaws emitted an odour which rendered life more intolerable than death.

We have passed the day of these living recitals of ignorance, and now, though salivation is practised in some forms of disease, it is never carried so far, by intention, as to lead to consequences so seriously absurd as those above-named. Once, in a case where mercurial powders, by a mistake between nurse and doctor, were given to a child suffering from a slight febrile disorder, I saw the whole of the deciduous teeth made to slough away in a deluge of purulent fluid, and, as a further evil, a permanent set of teeth developed, all of which were of dark colour, brittle, pitted, and very soon carious.

Thus we see that alveolar abscess has an extended range of causes. I might enlarge on this point, indeed, vastly. But the leading facts being supplied, the rest must for this time remain.

The last variety of purulent disorder in and about the teeth, is that form of ulceration and purulent exudation, known under the very absurd term "cancrum oris." The affection is one mainly confined to children, and some confusion has arisen regarding it, by the fact that the term is too indefinite to be of practical meaning. It were well, indeed, to throw overboard the term cancrum oris altogether, and to speak of the affection now in hand, as suppurative ulceration of the gums and mouth.

I have said this disease occurs in children, and, ordinarily, during the period of the first dentition. I have told also, in a previous lecture, that the disease occurs only in the children of the poor, and in children badly sustained by the essentials to existence, food and air. I do not think there is any necessity to divide the purulent ulceration of the gums and mouth into two classes, as Mr Tomes suggests, viz., into ulceration as affecting the gums, and ulceration as affecting the other parts of the oral cavity. In Dispensary practice, I have had great opportunities of observing this disease, and my belief is, that as regards the kind of ulceration, as regards the exudation, and as regards general symptoms, there is only one disease, and that the position of the ulceration whether on the gum structure or on the inner surface of the cheek, is the merest accident.

In its course the disease does not commonly present itself until some of the deciduous teeth are through; nor does it commonly present itself after the appearance of the temporary teeth. The affection is always preceded by general symptoms. The child is fretful, has griping pain in the bowels, has diarrhœa, has a burning pungently hot skin, great redness of the lips, gums, and tongue, and intense thirst. The saliva secreted at this time is strongly acid, and the excreta from the bowels are also acid. The attendants of the child are, moreover, conscious of an unbearable sour odour as arising from the body of the child. After a little time the true local symptoms appear. The parts of the mouth covered with mucous membrane swell and easily bleed. The lips often swell to double their size. A child brought before me yesterday presented this symptom in a severe degree; the upper lip was everted by the tension and cracked in bleeding fissures. The swollen condition having lasted for a period varying from two days to five or six the surface disintegrates at some point and the ulceration commences. A common point of ulceration is in the lower part of the buccal cavity, especially in parts where salival secretion can accumulate, as, for instance, at the point of junction between the lip and gum. The ulceration is indeed excited, as I think, by the presence of a diseased salival excretion. Once started, it extends readily, breaking out in several patches, and leading to the exudation of free and offensive thin purulent matter, which, together with the saliva intermixed with it, fills the mouth at times with fluid, and excites appearances not unlike those produced by mercury carried to salivation.

The termination of the disease may be fatal under the best treatment, for the little sufferer is subjected to a triplet of misfortunes. The ulceration and discharge feeds on itself. Excited primarily by a degraded state of the blood, it progresses the more rapidly, as the nutritive process is the further degraded. There is added, too, the wear and tear of pain, and there is added, also, the difficulty of feeding. Thus, surrounded by all these evils, the disease is most difficult to meet, and in recovery, there is a slowness which calls for an extraordinary exhibition of patience.

In extreme cases the gum is entirely removed, and alveolar exfoliation is the consequence. In most cases the deciduous teeth are rendered carious, and the temporary set are sometimes injured. Dr Harris, quoting from Delabarre, gives instances in which there was softening of the whole maxillæ, and carbunculous destruction of the cheek, hectic, and rapid death. These cases must be extremely rare. The same authority remarks that the disease is most common amongst females, but there are really no reliable data to prove that sex alone has any predisposing tendency.

There is one other form of purulent deposit which, though not manifested in the teeth or gums, depends, nevertheless, on the teeth; and deserves, therefore, an incidental notice.

In strumous children it sometimes happens, that during dentition there is enlargement and suppuration of the cervical glands. In many instances which I have seen of this kind of affection I have been able to trace the irritation to the teeth as the starting point. I have seen cases of this character in which enlargement of gland has followed every attack of dental irritation, and I have seen the glandular enlargement subside as soon as the irritation from the dental organs was relieved.

There are other cases in adults in which something of the same kind may result from the presence of a tooth having diseased fangs. A gentleman once applied to me for a hard swelling immediately under the jaw, and which showed a decided inclination to suppuration. After trying many remedies, I began to suspect that a diseased tooth was the head and front of the offending. The tooth, a first-lower molar, was situated directly over part of swelling. It was a very irritable tooth, and was of little use in mastication.

After much persuasion, my patient consented to have the tooth extracted; there was enlargement of the fangs, and the removal not only gave immediate and obvious relief but produced a quick and permanent subsidence of the external tumour.

In speaking of the general effects produced by purulent deposits, I alluded to certain present and after symptoms of a systemic kind as attendant or subsequent phenomena. These were the acute fever, the exhaustion consequent on the exudation of purulent matter, the low typhoid condition produced by decomposing pus, and pyæmia or impregnation of blood with purulent fluid.

In purulent diseases of the gums and their adjacent parts, the preceding and coincident acute febrile state is never absent. In diseases of the antrum, when pus is freely thrown out the subsequent exhaustive fever is often present, and in the purulent ulceration of the mouth, this exhaustive condition is a marked sign. In some cases of extreme kind, poisoning by absorption of an alkaline gas disengaged by the fœtid pus may likewise present itself, and under unfavouring states even pyæmia may be a result. The latter, however, is an uncommon sequence.

But this point must always be remembered in connection with purulent exudation in and around the teeth, as in fact specially marking these affections—that whenever there is fœtid matter in the dental structures, every breath inhaled, every fluid or solid swallowed is charged with diseased products in their fluid or gaseous form. In the mildest varieties of purulent disease in the mouth this result has weight; the poisonous inhalation tells speedily upon the general health; the body becomes anæmic; the stomach becomes deranged; the spirits flag; and, as the drop of water by persistence of repetition wears away the stone, so the slightly diseased tooth, acting as the source of a steadily produced poison, slow and insidiously sets up in the system a train of disorders, which render health an impossibility and life a burden.

In cases of extensive purulent formation, as in the purulent ulceration of children, the evil here indicated is intensified twenty fold. I have often wondered in cases where the health was intolerable from the cause named, by what conservation of nature death direct from volatile putrid poison was averted.

In the treatment of the purulent affections now considered. certain general principles, well impressed on the mind, serve the practitioner better than the most refined arguments in detail. If the principles are known, the details follow. Let me, then, shadow forth those general rules which modern knowledge, as to symptom and cause, supplies, both by inference and experience. In the acute stages of a disorder in which the formation of purulent matter is dreaded, the first principle then is to look for, and if possible remove, the local irritant. If a gum is under distention, let it be divided; if a diseased tooth is the irritant, let it be removed. If removal of the irritant is impossible, the next best means is to soothe the local suffering, by exclusion of air and the use of anodyne applications, as opiate stopping or opiate fomentation. You will find most writers recommending bloodletting by leeches as the remedy. You will find in that practice but little satisfaction. Dr Arnott, in cases of acute inflammation, from which the suppuration in acute cases originates, would recommend extreme cold—congelation—as the local remedy. It is undeniable that extreme cold is the best local narcotic known, and could it be applied readily cold would be the most powerful local remedy in the hands of the practitioner; but, inasmuch as it is not easily applied, it fails in half its value as an every-day resource.

In these acute stages of disease, the systemic treatment must also be remembered, and such remedies may be used as tend without producing extreme depression, to reduce vascular action, and, most of all, to remove pain. For these two indications, antimony and opium are the grand remedies. In acute inflammation of the dental pulp, in inflammation of the lining of the antrum, in inflammation of the periosteal membrane, it is marvellous to see the effect of a quarter grain of tartarized antimony and a full grain of opium powder. You shall search the Pharmacopœia till Doomsday, and you shall find no better remedy for the symptoms I have described.

2. When pus has once formed, it is a principle to try no longer to stop its development, but if it is exciting great pressure to set it free by operation, and to support the system to the eliminating work that is before it. You nourish your patient judiciously well now. You nourish him with animal food; a little wine. You give him fresh air in all the abundance in which it can be procured. If you give him remedies, you prescribe those which shall correct secretion and sustain—the grain dose of quinine, or the ounce of bark decoction; the five or ten minims of dilute mineral acid; or scruple dose of the carbonate of iron. And do not be afraid, either, to begin your supporting plan too soon. There is a mania against supporting remedies out in the world. Let the mania have its swing unheeded. Hecatombs of sick have died under and from depressants; there was never sick man yet who died from the judicious application of natural supportive measures.

I have said that the first local measure required in these purulent diseases is to give free exit to the purulent exudation. True, and if recovery responds to this, enough has been done. But if the purulent exudation remain, and is clearly kept by a foreign body, as by a necrosed tooth, or portion of necrosed alveolus, clear it is that this foreign body should be removed.

3. About washes and lotions in cases of purulent exudation. If the secretion of pus be very free; if the pus is confined in any cavity as the antrum, but not so confined but that it can be mechanically washed out, it is proper in both these cases to remove it by washing, for which purpose simple warm water as a wash is the golden lotion. Should a granulating surface from which pus exudes be slow to repair, it may be stimulated by applying to

it a water wash containing one or two grains to the ounce of the sulphate of zinc. Or should a granulating surface put forth an excrescence, such excrescence may be destroyed by caustic. Or should a spongy structure, as the gum, remain soft and vascular, some very simple astringent water (there is nothing better than alum water) may be applied with advantage.

But to invent remedies farther removed from common-sense requirement and simplicity than these simple ones—to mix a crucible of messes together, and like our dog doctor rascal (from whom may the very dogs be preserved!) say, "Here is a lotion of specific power; come buy: — come, buy;" — this is specific quackery, be its guise and representation what it may.

Lastly, in those purulent affections which seem to have a pure constitutional origin, such, for instance, as the purulent ulceration, or cancrum oris, the treatment from first to last is primarily systemic. Locally, all that can be achieved is to remove foreign bodies in the ulcerated part and to keep the mouth clean by simple water washing.

Medicinally, in these cases much may be done. A gentle aperient is always good; and two remedies at hand appear to exert a special beneficent action. These two remedies are the chlorate of potassa, and the carbonate of iron. The first may be given in doses varying from five to ten grains three times daily; the second, in the form of syrup, in from ten to twenty grains three times daily. The smallest of these doses may be given to infants of a year old, and either remedy finds a good menstrum in common water.

Hygienically, the treatment will turn on the air respired: this must be free and pure. Next, this treatment must turn on diet. It will be found that the majority of children who suffer from this affection have been kept on starchy foods—on bread, on rice, on gruel, or the immortal tops and bottoms. These must be removed, and simple milk diet substituted. You need think of no other food for these sufferers, if you can secure for them good milk, and plenty of it; the egg and the flesh, the oil and the wine, are all concentrated in this one fluid—this food provided and even ready prepared by the Divine Father.

MONTHLY MEETING, TUESDAY, MAY 3RD.

JAMES HARLEY, ESQ., IN THE CHAIR.

Mr Mather, gas engineer, exhibited a self-sustaining gas blowpipe apparatus, invented by himself, for soldering. It consisted of a boiler containing water, which was converted into steam by a small gas burner underneath. The steam (which is the blowing power) was conducted by a pipe through the burner just named, thereby becoming superheated, and passed on to another burner, where it acted as a blowpipe jet with a powerful effect in projecting a flame upon anything requiring soldering. By regulating the quantity of gas burning under the boiler, either a strong deflagrating flame, or a fine pointed one, was obtained, as desired. This apparatus leaves the hands of the workman perfectly free to operate in any way he pleases, and is so portable that every workman in a shop could have one for his use. It only requires the water to be replenished once in an hour, and it is so arranged that hot water is always ready for it. The cost of it is less than half that of any bellows arrangement for the same purposes, being merely 25s. Its powers were exhibited by some articles being soldered with silver in a very clean and rapid manner, and quite to the satisfaction of the chairman and gentlemen present.

The Chairman said that the invention displayed much ingenuity on the part of Mr Mather. He was sure the members present appreciated Mr Mather's kindness in bringing it forward this evening, and in their name he begged to thank him for having done so.

Mr Rymer said it had just come to his knowledge that a large number of members were under the impression that the ordinary meetings of the College would be immediately discontinued, in consequence of the resolutions passed at the last Special General Meeting. This was a misapprehension. The meetings announced for the Session would of necessity be held, and these would not terminate until after the Meeting of Members on the first Tuesday in June. Mr Rymer proceeded to place the meeting in possession of very interesting information with regard to the exertions of several gentlemen during many months past towards forming a School of Dental Science, wherein a thorough practical knowledge of Dental Surgery and Mechanics in all their branches would be taught. The School was, however, entirely independent of the College of Dentists, but the instruction to be afforded would include the requirements of the Body of Examiners of the College as well as those of any other Examining Board in this country or elsewhere. A Committee of noblemen and gentlemen were also about to make arrangements for opening an Infirmary for Diseases of the Teeth, and he believed they would so co-operate with the Faculty of the Metropolitan School of Dental Science, as to secure mutual advantages.

Mr Humby then read a paper on TAKING IMPRESSIONS OF THE MOUTH, of which the following is a summary:—A CORRECT IMPRESSION of the mouth is essential to success in the adaptation of artificial teeth. Many materials have been, and are still, used in taking impressions. The most common is pure bee's-wax. This is spoken of in a work published so far back as 1757 (more than a hundred years ago) by a Monsieur Bourdeau. But plaster of Paris, a mixture of bee's-wax and rosin, gutta percha, and other substances find their advocates respectively amongst dental practitioners. I believe one and all to be objectionable. There is, however, a material which I have found answer the purpose in every particular, namely, the plastic compound introduced by Mr Stent, of Coventry street. With this composition I have never found any difficulty in obtaining an impression, even in the most unpromising case. I do not mean to say that I have always been successful with the model trays in general use, as there are cases where I have been unable to get an impression with them, but I have overcome the obstacle by means of a small invention of my own, which I will explain to you. The invention consists in adapting a tray so as to render it capable of being rendered broader or narrower at pleasure. The advantages are these: In a case where the alveolar ridge is broad and the mouth small, the plastic compound may be introduced into the mouth most conveniently, the tray being partially closed, and when in the mouth expanded to the required breadth. The front part of the tray is movable by means of a screw, so that in cases where remaining teeth project unduly, room may be made for them. The composition can be pressed into the palate by turning the thumbscrew attached to the handle. Lastly, three sizes only of the tray are required by the practitioner, as each can easily be enlarged or diminished.

Mr Humby exhibited then several difficult impressions he had taken with the improved tray and Stent's compound, including one of a very remarkable case of cleft palate, and concluded by thanking the members for the attention with which they had received his observations.

The Chairman remarked that the tray alluded to by Mr Humby had been illustrated and explained in the 'DENTAL REVIEW;' nevertheless he felt indebted to Mr Humby for exhibiting to the meeting the invention itself. He was, however, of opinion that cases were extremely rare where correct impressions could not be taken with ordinary trays and pure wax.

Mr Finzi considered that Mr Humby had exercised considerable ingenuity in the adaptation of his model tray.

Mr Rymer thought that pure wax was preferable to every other substance in taking impressions, and as he was generally sufficiently successful with it, he doubted whether he should employ any other material unless superiority was clearly proved. He had tried a composition very similar in appearance to that placed in his hand by Mr Humby, but he found that it required a high temperature to soften it, and that it was necessary to obtain the impression whilst the composition retained such great heat that few patients could endure it. In one case, of an old sea captain, he remembered its employment had been followed by exclamations condemnatory of the unpleasant sensation caused by the heat, in strong terms which he would not then repeat.

Mr Humby said that the composition alluded to by Mr Rymer was quite different to Mr Stent's; in proof of this Mr Humby softened some of the latter in presence of the meeting, and Mr Rymer acknowledged that the materials were not the same, as the objectionable heat spoken of by the latter gentleman was manifestly not present in the compound exhibited by Mr Humby, although it was rendered sufficiently soft to take any impression.

After some further remarks from Mr W. Perkins, Mr Hockley, and others, the Chairman proposed a vote of thanks to Mr Humby for the paper he had read, which was carried unanimously, and the meeting adjourned to Tuesday, June 6th.

CORRESPONDENCE.

THE NEW DENTAL SCHOOLS.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—The announcement contained in the last number of your valuable journal, that two Schools of Dental Science are likely to be opened ere long, must be regarded by every well-wisher to the Profession with feelings of the utmost satisfaction. It is a question whether the two schools might not advantageously be merged into one, especially as the Metropolitan School of Dental Science appears to be almost complete in all its departments, whilst the London School of Dental Surgery is not yet in possession of a Faculty. However, this is a matter to be settled by the Executive of the Schools respectively. Under any circumstances, whether we are to have one school or two schools, means will doubtless be provided for practical instruction, so that the student willl be enabled to pass his examination at the College of Dentists or elsewhere with credit.

I think it cannot be impressed too strongly upon our pupils that it should not be their only aim to "pass" an examination. That they should not be content without attempting, to the best of their ability, to *excel* in the various branches of the Profession. A course thus commenced will, undoubtedly, prove of incalculable advantage in after life; for a good man, who has by industry and integrity achieved success in the *study* of his Profession, *is not likely to be outdone in the practice of it* by those who just exert themselves enough to "pass" an examination once in a lifetime, and then relapse into a sluggish indifference, in the hope that the gods will help them on.

Permit me, Sir, in conclusion, to thank you for the powerful influence for good exerted by your advocacy of the cause of right—an advocacy which, in the end, will doubtless secure that general unity in our body which, I believe, is so much desired by all.

I beg to remain, Sir,
Your obliged servant,
A Regular Subscriber.

London, May 20, 1859.

THE VULCANITE BASE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—I will feel it no ordinary favour if you will allow me to correct an error which may become serious in reference to infringements of certain portions of my invention and patent:—" The Paragon Laboratory

Forge." This I am the more anxious to do, as there seems to be among the profession a general feeling to treat with indifference the claims of real patentees, and although this is undoubtedly the consequence of having matters or things foisted on them as patents which had ceased to be so, or were not patents at all, yet I think there is no honourable minded man (whether manufacturer or private operator) who would tamper with the invention or lawful patent of another if he knew it, and on which account I wish to be distinctly understood, when I state that in patenting my invention, I did it (under these circumstances) *for protection,* and not to follow any example of overbearing monopoly; I therefore require the protection the Patent Law allows, and am resolved to avail myself of it, as I feel that a liberal profession will not object to recognize what is true and real.

This invention I have long endeavoured to make most complete and equal to its requirements for chemical and dental laboratories; in fact, capable of every variety in the application of heat, so that if any new base, or other mode of supplying dental substitutes, where heat is required, should be offered to the profession, a dentist with my complete apparatus would hardly need to buy one for every new base, as he would find himself prepared; and this is speaking in moderation, as one portion of my apparatus is for block teeth and continuous gum work, another suited for cheoplastic, or fusing, lead, zinc, silver, and gold, another for soldering, another portion for vulcanizing or the like operation, by either dry or moist heat, and therefore *safe* and *efficient.*

I must add there are just reasons why I cannot yet bring out my complete apparatus; that portion, however, which I have now ready is for vulcanizing India-rubber, and is one of a number of hot baths, and may now be had separately, so that those who purchase this at present can have the other complete portion at any subsequent period, as a due allowance will be made for their taking the present part, and this I offer at prices which only allow of a very moderate compensation; indeed I think it a matter of importance that with my arrangement I produce the same effect without the steam pressure so much talked of, and certainly without the danger, as any person can hold their hand within a few inches of the funnel during the highest point of heat to produce a vulcanite; and neither be burnt nor scalded; neither in point of economy is it surpassed; the other day I had the burner lighted for seven hours, and an extra branch for four hours more, during which the cost for the entire gas consumed did not exceed *two pence halfpenny!*

Now, Sir, as I have been one of the first to manipulate—since the present introduction of dental vulcanite—and having taken a practical interest in it, and, speaking from experience, I beg to correct a most farcical statement for some time in circulation as touching this interesting process. It is stated of the High-pressure and the Superheated Steam Apparatus that either of these forms of atmosphere is necessary to produce vulcanite, *because of pressure*—now it is plain, if an engineer had any knowledge of these matters, and heard or gave this as his opinion, he must be either unacquainted with the subject or grossly misinformed, for indeed the only portion on which there is any pressure is on the entire sides of the boilers or vulcanizers.

Steam is so subtile an agent that, at a very low temperature, when confined (much below what is required to produce a vulcanite) it penetrates thoroughly anything a dentist is likely to submit to its action, so that whatever is placed inside these vulcanizers receives no pressure. I should like to know what the teeth would be worth that should have a pressure at the rate of 70lbs to the inch applied to them. Then again, when the surface of these high-pressure and super-steam vulcanizers are measured and reduced to inches, it will soon be seen the amount of pressure on the whole surface at 70lbs per inch, and the danger attending their use for any great length of time, to say nothing whatever of destructive acid gases, &c.

I find it stated in some of the circulars that these latter kind of apparatus is preferable to dry heat, as "avoiding the uncertainty and ineffectiveness, &c." This is certainly another instance of one's talking rather fast in one's new-born zeal to advance a good cause; the fact is, the reason why dry heat has until recently failed, was from the very elementary character of the experiments with it on the one hand, and a wrong application of it on the other, so that little, indeed, could be expected from either—dry heat and moist heat, without high-pressure or super-heated steam, has produced as good vulcanite and as regular as either of those dangerous modes.

In fine, as I am sorry to notice a disposition on the part of some to infringe my patent, I beg to add that mine is the only legal one for this form of dry or moist heat without pressure, that any of the profession would be safe to use—and on which I must refer them to the *notice* or *caution* of my solicitor among the advertisements, and which I shall think unnecessary to repeat after the present issue. I also beg *to assure every person* concerned that I do not add this, nor the caution alluded to, as a set-off, for I shall certainly deal with any infringement I may discover.

Hoping you will grant me the indulgence I ask in giving this publicity in your widely-circulating journal,

I am, Sir,
Most obediently, your servant,
H. W. Patrick.

American Dental Laboratory,
18 Broad street, Golden square, W., London,
May 21, 1859.

Obituary.

Since our last impression the scientific world has lost one of its most illustrious ornaments in the person of Alexander Von Humboldt. Of Humboldt it has been justly said—"There is not one branch of science to which he has not contributed something, nay, much. The powers of his mind seemed to increase as they produced." To English readers M. Von Humboldt is best known by his celebrated and latest work, 'Kosmos.' This great and good man peacefully departed this life, aged nearly ninety years, in Berlin, early in the past month of May, and he was interred on the 10th of the same month in the cathedral of that city; all the representatives of science, art, and intelligence in the neighbourhood having assembled to pay a last tribute to his genius.

We have also the painful duty to record the death of another distinguished labourer in the field of science, namely, Dr Dionysius Lardner, who died in Paris on the 5th of May, aged sixty-six. Dr Lardner's popular works on science are too well known to require enumeration. Suffice it to say that the familiarity and facility of expression with which they are written, coupled with the soundness in a practical point of view of the conclusions arrived at, render them universally acceptable.

COLLEGE OF DENTISTS OF ENGLAND.

ARRANGEMENTS FOR JUNE, 1859.

June 7th.—GENERAL MEETING. NOTICE. ELECTRICITY IN DENTAL OPERATIONS. The Council of the College of Dentists beg to notify that the REPORT OF THE COMMITTEE appointed to test the value of ELECTRICITY as an ANÆSTHETIC will be presented, at a Meeting of the College at 5 Cavendish square, on Tuesday Evening, June 7th, at Eight o'clock precisely. Members of the Profession generally, whether in connexion with the College or not, are invited to attend, and will be admitted on presenting their cards. Scientific Gentlemen taking an interest in the subject, will also be admitted on production of an order, which may be obtained from the Secretaries on written application.

By order of the Council,
PETER MATTHEWS, Chairman.

May 20th, 1859.

NOTICES TO CORRESPONDENTS.

⁂ For the convenience of those who intend to bind the REVIEW at the end of the year, and to prevent disappointment, it is requested that subscribers will carefully preserve the several numbers, as of the back ones very few remain.

THE HISTORICAL REVIEW OF DENTAL SURGERY is unavoidably postponed to next month.

MR T. BATES.—The names of the Lecturers will be found in the advertisement of the Metropolitan School of Dental Science. The School is entirely independent of the College of Dentists or of any other organization. For details of information we must refer you to Mr Kempton, the Secretary to the Faculty.

JUVENIS will find the case reported by Mr Thomson, and alluded to in Mr Robinson's communication in the 'Quarterly Journal of Dental Science,' Vol. I, p. 146.

F. H. The election rests with the Council. The usual course is to apply for a "Candidate's form of proposal," to the Secretaries of the College, of whom all particulars may be obtained.

M. ADOLPHE. The REVIEW may be had in Paris of the Publisher, 19 rue Hautefeuille.

Letters, communications, &c., have been received from Dr Richardson, Mr James Robinson, Mr Maguire, Mr Canton, Mr Kempton, Mr Perkins, Mr Thompson, Mr Hockley, Dr Purland, Dr Blandy, Mr Williamson, Mr Bates, "A. Z.," "Juvenis," Mr Low, "F. H.," M. Adolphe, Mr Patrick, &c., &c.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED.

Dental Register of the West, *in exchange.*
New York Dental Journal, *in exchange.*
L'Art Dentaire, for May, *in exchange.*

THE

DENTAL REVIEW.

JULY, 1859.

A CHARTER FOR DENTISTS.

STEADY progress continues as the order of the day in our ranks. Our brethren have made up their minds according to their tastes and independence, and although there are yet two sides to the dental question, the opposing divisions are agreed that the opposition shall be fairly conducted. Such opposition, as exists at present, involves, in fact, principle rather than feeling. The point to be settled is summed up, as we have before summed it up in this decision: whether the Dentists of England are old enough to take care of themselves: or whether their juvenility is of such uncompromising weakness that they must fall back on the Surgeons' College as their nursing mother, content, when all the other children are fed, to pick up the crumbs from beneath the emptied table?

We have never minced the matter in giving our opinion as to results. There are such persons as Englishmen still in the flesh, and there are such persons as English Dentists (a pretty compact body if we are not mistaken), who, unless the soul of English spirit is now let out wholesale to a "rifle corps," are not very likely to give up the idea that, after many years of labour and learning and honesty, they are old enough to take care of their own political interests, and the education of their pupils and children.

This feeling, so natural to every man on this island, would be alone sufficient to stop the progress of the movement now being tried of making the dental profession the humble vassal of the London College of Surgeons,—a college which has sold itself to money-making schemes and despotic government with such unceasing zeal that in medicine and surgery it is looked on with universal disfavour, and which lives not on its deeds but on its possessions; viz., a fair library, a large block of stone-work, and a museum collected by the industry of John Hunter. But the English feeling to which we refer has support in the fact of an organization pledged to its interests, and each day becoming stronger. A long struggle there has been truly; influence pitted against principle, and wealth against faith. But the principle and the faith, as was ever the case, have held ground, and now, with public favour by their side, the advocates of principle are in possession of a position which has all the vantage of a victory. In fine, the question is decided; the Dentists of England will have their own rights respected, and will be recognized by and through their own exertions and organization. The College of Dentists knows this, and is amending its ways. Did the College stoop to the shrewd Delilah, and lose its locks? It did. Not all its locks, for it kept its name, but enough to make it for a long time an undecided body, which lived on simply because there was nothing better to replace it, and keep in check the little despotic attempt, at making English Dentists the trainbearers of two or three ambitious but feeble aspirants to political ascendancy.

But now we say that the College has amended its ways, gathered strength, and placed itself on its own bottom once more. With the remembrance of the past, to make it better and firmer, and as knowing not only what is required to be done, but the way how to do and act, the College has taken a turn indeed. An examining board, a school excellent in its arrangements for instruction, an increasing phalanx :—Does the College want more to give it strength? A little more. It wants law. Give it incorporation, and its stability is complete. Towards this the members must advance; they must neither hesitate nor pause nor tire till this great object is attained—*their charter.* Difficulties they may expect to meet, oppositions, contempt—

> And the spurns
> Which patient merit of th' unworthy takes;

but let them go on, and like the Roman king at the voice of the Augur, "cut boldly," and the stone will be divided by the razor.

Information, coming to us from sources moderately safe, informs us that the Council of the College of Dentists have in view the ultimatum which we now point to. It is well if the fact be so. Meanwhile we would encourage the Council of the College to proceed in the course it has taken; to support with all its influence the educational movement, to institute its examinations, and to issue its certificate of qualification. These things done well are as fact like, and to the College as honourable as though it had the prestige of a charter with the Conqueror's name at the seal. They will help on to the incorporation ; and they will secure a strength in membership, which would constitute in time an all-powerful organization though no charter should issue to it from Royal hands.

But the charter is, after all, the true compact. The Dentists of England must have a charter.

DENTAL SURGERY AND MECHANICS.

THE CAUSES OF IRREGULARITY OF THE TEETH.

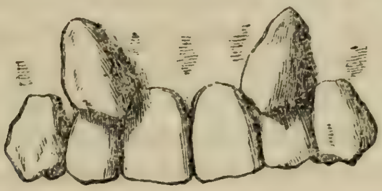
BY MR JAMES ROBINSON.

(Illustrated by Felix Roffe.)

Continued from page 339.

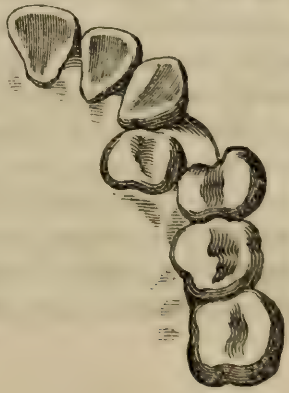
THE central teeth in both jaws occasionally overlap each other, owing either to a too crowded state, the increased size of the second teeth, or from a want of expansion of the jaws to admit them uniformly. In these cases the removal of the two lateral temporary incisors on each side is necessary to give space for the permanent incisors to arrange themselves.

The lateral incisors in the upper jaw occasionally also overlap the centrals and sometimes pierce the gum posteriorly, and in the lower the same irregularity exists, but there the teeth being larger than the centrals in this jaw, their lateral edges are frequently turned, from want of space, either interiorly or externally—in all such cases the deciduous canines should be extracted. But if upon examination of the jaw it be ascertained that an expansion of the arch may be anticipated, it would be well to delay their removal for a time, as they tend to preserve the shape of the arch itself. Irregularities are frequently met with in the cuspidates in both jaws, these are the last teeth to make their appearance in the anterior part of the jaw, after the others have been developed and arranged. They generally lie imbedded high up in the alveolar process, where they can readily be felt, by their causing a protuberance on the external side of the gum; the bicuspids also in these cases very commonly have arranged themselves close to the laterals, leaving no room for the canines. In these cases it is advisable not to wait until the canines are fully developed, and forced over the laterals. The student should at once remove the first bicuspids on either side or the first molar, if a predisposition to caries be discovered. To these kinds of irregularities I would particularly direct the special attention of the pupil, as on the proper development and arrangement of the cuspidates, the beauty and contour of the mouth materially depend: in fact these teeth, it may be said, are the key-stones of the dental arch: remove them, and we shall ultimately have an imperfect and distorted structure. If the canines have been developed directly over the laterals, their crowns leaning towards the centrals, it will be absolutely necessary to remove the laterals to permit the canines to arrange themselves by the sides of the centrals.



Nothing can justify the removal of the canines except in those cases were they have been developed very high up in the alveolus externally to or within the dental circle. The bicuspids also occasionally pierce the gum, and arrange themselves by the sides of the laterals, leaving no space for the canines; in these cases, as soon as developed, the first bicuspid should be extracted on each side. These teeth also, from want of room, are frequently found developed either inwards or outwards from the dental circle. To remedy these unsightly defects it is necessary to remove the deciduous molares if remaining in the jaws, and then, should there not be sufficient space for their arrangement, the first permanent molar teeth also, more especially if these teeth are decayed or their physical character denotes a disposition to caries, if not, the second bicuspids; by adopting either of these plans, sufficient space will be obtained for the first bicuspids to take up an uniform position.

The operator upon whom the responsibility of the arrangement of these organs devolves must carefully study to preserve an even and regular contour of the eight front teeth in both jaws—at the same time he must bear in mind that it is better to sacrifice the second bicuspids than a healthy permanent molar—particularly if the bicuspid has pierced the gum in one of those malpositions which would prove an obstacle to a perfect articulation. The following exhibits the development of a bicuspid in the position I have been describing.



The first permanent molar teeth piercing the gum at an age before the deciduous teeth are removed, meet with no obstruction to their development, and the same observation may be generally applied to the second molars. Therefore the services of the dentist are not, generally speaking, required. I feel quite convinced that to the cutting of the first permanent tooth may be attributed the deformities so frequently met with in the second denture, irrespective of malformations and contraction of the maxillary arches; and as a general rule in cases where there is a tendency to crowd towards the centre, and a moderately well-formed arch, I do not hesitate to remove them, particularly if their constitutional character denote a tendency to early caries, in order to prevent the ultimate consequences of crowding of the canines and laterals, and the overlapping of the centrals.

The third molar or *dentes sapientiæ* (wisdom teeth) make their appearance at almost any period after eighteen years of age. I have, however, a case in my collection where it appeared as early as fourteen, and another as late as ninety-two years of age. In most instances their appearance is indicated by more or less suffering to the patient, and their development most frequently produces such an amount of pressure towards the anterior part of the jaw, that they cause not only an overlapping of the central teeth, but injurious and destructive lateral pressure on all the other teeth—therefore we frequently may consider that the denture generally is safe previously to their development.

During the progress of their advancement through the gum the uniformity and healthy condition of the remaining organs may become injured by lateral pressure, and this may occur although the arches be moderately well developed and expanded. Therefore, in cases where the other teeth are perfect in health, shape, and regularity, I recommend, immediately after the *dentes sapientiæ* have pierced the gum and the crowns are sufficiently developed, that the student should extract them either with the forceps or elevator, so as to avoid the possibility of mischief to more important organs. If, however, the first or second molar and bicuspids show symptoms of lateral caries, I should recommend the removal of the diseased organ, which will not only prevent pressure towards the centre, but afford space for the approaching tooth. Very frequently these wisdom teeth pierce the gum in a diseased state, producing intense suffering, and in such cases it is better at once to extract them, and then, by the use of india-rubber, the file, and stopping, endeavour to remedy any mischief in the more important teeth.

There are cases in which the *dentes sapientiæ*, from want of room, cannot pierce the gum, but being deeply seated in the alveolus and imbedded in the gum, produce intense suffering, and even danger of starvation in some instances. In such cases as these, and after the usual remedies of scarifying the gum, applying leeches, &c., have been employed, affording frequently at the best but temporary relief, the student is justified in extracting the second molar, which he will invariably find will give the patient almost instantaneous and permanent relief, and also afford space for the wisdom tooth to come forward and escape from the gum. As I before observed, these teeth are frequently affected with disease, and either pierce the gum in that state, or in a few months show symptoms of caries; therefore, when a well-arranged and a constitutional and physical healthy denture exists in a young patient, and when a sufficient development of these teeth has taken place, it would be sound and judicious practice to at once extract them, for as a general rule these teeth must be viewed as being one of the exciting causes in such cases of lateral caries and disarrangement of the anterior teeth.

There are occasionally other malpositions of the teeth, but they occur so seldom that it is unnecessary to advert to them; they all require the strictest attention and skill on the part of the student to remedy them either operatively or mechanically, or both, and in the treatment of all he must keep forcibly in view that lesser evils must be preferred to greater, that nature must not only be assisted, but the laws of the animal economy must be consulted and obeyed, not subverted.

THE MECHANICAL TREATMENT OF THE IRREGULARITIES OF THE SECOND TEETH.

In the previous observations I have endeavoured to give the student the methods of general management and treatment to prevent irregularities of the second denture, presuming, of course, in all cases, the patient has been from the commencement under the care of a dentist. The young practitioner, however, will be frequently called upon to exercise his inventive powers and mechanical ingenuity in difficult and tedious cases, in which the arrangement and development of the second denture have been totally neglected, and the patient is placed under his professional care to rectify by mechanical means what the simple extraction of a few teeth at an earlier period, generally speaking, would have prevented.

There is, perhaps, scarcely a branch in the practical part of our profession in which there exists such a diversity of opinion as on the kind of mechanical means, and the time when they should be employed, in the treatment of the irregularities of the second dentition ; not only are there innumerable mechanical contrivances constantly made use of, which in many instances are erroneous in principle, and consequently do harm instead of good ; but the time at which these mechanical means are to be employed with advantage is by no means a settled question amongst dental practitioners: the subject is one of the greatest importance, not only as regards the comfort and personal appearance of the patient, but of his possession of a free and perfect enunciation ; it therefore claims the particular attention of the student. Numerous works and papers have been written on the proper treatment of irregularities of the teeth, and most of the authors, though differing from their brethren in everything else, lay down the principle that no alteration in the position of the teeth can be effected after the age of from fourteen to fifteen.

I was long since impressed with the opinion that irregularities of the second denture were susceptible of great improvement, if not of a complete cure, at a much later period, contrary to the dicta of old and popular authors. These opinions have been subsequently confirmed by myself and others in the successful treatment of many cases where the patients had attained from twenty-five to thirty years of age; but in all cases where the student is called upon to correct irregularities of the second teeth by mechanical means, and he has the patient immediately under his charge, it is better to commence his mechanical operations when the child is about eight or ten years of age; of course even this period is dependent in a great measure upon the development of the adjoining teeth—the canines in particular ; if the case be left until the patient has attained eighteen or twenty, there is a reluctance to appear in society with any kind of mechanical apparatus, which more or less for a time causes inconvenience, and certainly does not add to personal beauty.

(To be continued.)

RESEARCHES
ON THE ORIGIN AND DEVELOPMENT OF THE TEETH AND JAWS.

By M. Natalis Guillot.*

Translated and communicated by Robt. T. Hulme, F.L.S.

The observation which was made by Eustachius in the sixteenth century (1516) is still repeated by writers in the present day:—" *Sicut cutis extremæ unguium parti adhærescit, ita gingivæ dentibus adjunctæ sunt.*"

The germs of the teeth are said to originate within certain folds of the mucous membrane of the jaws. These folds cover the earliest rudiments of the germs of the first and second dentitions. According to Arnold (' Med. Chir. Zeitung,' Salzburg, 1831), there may be seen on the margin of the gums, at the end of the ninth week of uterine life, a moderately deep groove with ten depressions at the bottom of it.

Somewhat later there is a flat surface having several apertures, into which fine threads may be passed. These apertures correspond to a similar number of small sacs.

At the third month the sacs of the second molars (temporary) communicate by minute foramina with the cavity of the mouth, while the openings of the other sacs have become closed up.

The sacs of the permanent teeth begin to be formed in a similar manner by the mucous membrane towards the fourth month of fœtal life.

Goodsir,† who admits the correctness of Arnold's observations, designates the first appearance of the germs as the follicular stage; this is followed by two other stages, which he names the saccular and the eruptive stages.‡

The first should be studied in the human embryo.

The follicular stage commences at the sixth or seventh week, and terminates at the fourth or fifth month of intrauterine existence. Each follicle is placed at the bottom of a groove, formed by the mucous membrane, where it remains until the margins of the groove approach each other and cover it up.

During the saccular stage, the mucous membrane forms a closed sac around the germs or follicles, and the tooth substance and the enamel, constituting the teeth themselves, are deposited. This stage commences at the termination of the first, and lasts until the eruption of the teeth.

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* From the ' Annales des Sciences Naturelles,' 4e Sèrie, tom. 9, p. 277, 1858.

† Goodsir " On the Origin and Development of the Pulps and Sacs of the Human Teeth."—' Edinburgh Medical and Surgical Journal,' vol. 51, p. 1, 1839. A summary of Goodsir's observations is given by Tomes in his " Lectures on Dental Physiology and Surgery," p. 69. London, 1848.

‡ Goodsir, *Loc. cit.*, p. 30.

The third or eruptive stage includes the completion of the teeth, and the eruption of these organs by the reopening of the dental sacs in which they were enclosed.

Several anatomists of repute have denied the correctness of the details thus minutely described. Valentine states that the alveolar margin of the two jaws becomes thickened at an early period, and that within this margin a series of oval vesicles arise, separated from each other by a compact granular substance; the latter increases, becomes more and more defined, and successively passes through the different stages of ossification to form the alveoli.

Rashkow,* who is more precise in his descriptions, formally denies the statements of Arnold.

He declares that he has never been able to see in the fœtus of man or of animals any openings like those which have been described; nor has he been able to perceive the closing up of the mucous membrane around the dental follicle. On the contrary, it has always appeared to him that the dental follicle was completely separated from the mucous membrane of the gum, and that, from the very commencement, they were not united by any intermediate substance.

The remarks of Arnold, which have been repeated by Goodsir, are therefore contradicted by Rashkow.

Wishing to determine these questions, I devoted myself to the study of them in man and animals.

Human embryos of an age suited to these investigations are difficult to procure. It is, therefore, only by chance that I have been enabled to verify in the human subject what is easily seen in the embryos of sheep. A large number of these animals having been at my disposal, I have succeeded on several occasions in seeing where it is that the dental germs originate; I have been able to determine their mode of formation, to analyse the metamorphoses and development of their tissues, and to point out the relations which exist between these germs and the surrounding parts.

These investigations might lead to other views than those with which I am now occupied. That, which at first appears as an isolated fact, is frequently only the particular expression of a number of phenomena which are common to the entire economy. In studying the development of the teeth, we arrive at a clear comprehension of the successive phases through which the tissues pass during the process of growth. Nowhere are the varying characters, which the primordial molecules are destined to pass through, more easily seen; nor is there any part in which the diversity and rapidity of these changes can be better appreciated.

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* *Meletemata circa mammalium dentium evolutionem.* Wratislaw, 1835.

The stage of dental development which is best known is the one which occurs subsequently to the formation of the dental sac ; on the contrary, those which are least known, and indeed concerning which there is entire ignorance, are the primordial or germinal stage, and the eruptive stage. How many anatomists have regretted their inability to explain either the origin of these organs or the way in which they emerge from the gums.

Occupied only with the commencement and termination of this interesting history, of which the middle period is well known, I shall content myself with recalling, and shall consider as correct, the observations of Valentine, Rashkow, Retzius, Owen, Huxley, Kolliker, and many others, upon the middle stage of dental development.

I have endeavoured faithfully to record the details which are contained in this memoir. The anatomical preparations from which the drawings have been made are in my possession.*

If the doctrines, which are generally taught with regard to the origin of the teeth, are attractive from their apparent simplicity—if they are well adapted to the impatience of minds easily satisfied, and seem at first to be clear and worthy of acceptation; on the contrary, they become extremely vague and hypothetical so soon as we endeavour to follow them out in detail, and it is soon perceived that these organs are formed in a very different manner from that which has been stated.

In order to comprehend what I am about to advance, it is necessary to have a distinct idea of the anatomical conditions of the different parts of the face in the embryo.

The general conformation of the face of fœtal sheep less than two weeks old, and of human embryos less than six weeks old, only allows the exterior of its future form to be recognised ; the details of the deep-seated parts afford no trace of what will hereafter become muscular fibre, cellular tissue, bone, or tooth.

At this early stage the whole mass consists of a homogeneous material.

During the first periods of uterine life, the body seems to be made up of an assemblage of molecules or cells agglomerated together; out of these arise numerous centres of growth. These molecules, which are constantly changing their forms until such time as each receives its permanent character, are so many centres of development for the tissues which concur in the formation of the different organs.

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* Most of these preparations were made by MM. Bourgoyne, No. 4 Rue Massillon à Paris, of whom similar ones may be procured.

The life and growth of the whole is only the expression of the special life and growth of each of these molecules.

When the entire organism is completed, and the molecules of each tissue has assumed its permanent appearance, the diversity of these forms is then so great that it is impossible to comprehend their primitive simplicity.

Between these two extremes, of which the first belongs to the earliest stage of embryonic life, while the second corresponds to the complete development of the organs, there are other transitory forms peculiar to the molecules of each tissue, and which indicate the stage of growth at which the tissue has arrived.

These successive transformations of the primordial material do not always give rise to a tissue which is destined to be permanent; they may, on the contrary, produce tissues whose existence is temporary. There are therefore parts of the organism provided for a special purpose, which disappear after fulfilling some function which is generally unknown.

The tissues of the Wolffian bodies, of the thymus gland, and the arches of the aorta, are examples of this.

The anatomical study of the jaws demonstrates the existence of one of these organised parts, whose use is temporary and whose duration is limited.

This part is present from the earliest period of embryonic life. Around it the jaws are developed; and in the substance of it the teeth originate, formed by the transformation of its component molecules.

The original source of the teeth, it is also this part which protects them during their growth; when this double purpose has been accomplished, it is gradually obliterated and disappears during the last phases of dentition. It is this part which I now proceed to examine.

OF THE PART WHICH DEVELOPES THE TEETH.

The situation which is occupied in each jaw by the part which developes the teeth never varies (pl. 1, page 409, figs. 1, 2, 3, 4, a a; pl. 2, page 471, figs. 1, 2, a a), but its general appearance changes according to the age of the teeth in consequence of the tendency which the osseous substance has to envelope it more and more. (Pl. 1 and 2, a a.)

The continuity of this part is complete during a certain portion of embryonic life ; it is, on the contrary, interrupted during the most advanced periods of the growth of the teeth and jaws.

The particular form of the molecules of which it is composed is variable.

This part, which is peculiar to man and the mammalian animals, rises up over the whole thickness of the region, from whence the jaws originate (pl. 1, 2, a) ; it is covered to a great extent by the mucous membrane of the mouth beneath which it is placed. (Pl. 2, a a.)

In order to understand these changes, it is necessary, while following step by step the development of the bone and of the periosteum of the jaws, to analyse the transformations of the molecules of which this part is composed. The changes which occur in the entire mass are correlative with those which are observed in detail.

When, towards the fifteenth day of gestation, several vertical sections are made of the maxillary regions in the embryo of a sheep, the surfaces present the following peculiarities:

Some slight traces of osseous substance can barely be discerned, already delimiting to a certain extent the part just alluded to. (Pl. 2, a a, o o.)

These primitive traces of bone, although extremely slight, separate into two layers the thickness of the matrix, out of which the whole of the maxillary regions of the face are formed. (Pl. 2, a a, o o.)

One, placed on the exterior of the developing bone, becomes the centre, from whence originates the periosteum and all the tissues situated between the jaws and the surface of the cheeks (pl. 2, fig. 1, p p) ; the other, placed in the maxillary groove, of which the rudiments now begin to appear, is the portion which developes the teeth (pl. 2, fig. 1, a a). The two are in reality confounded together by a complete union.

It is difficult to determine the dimensions and to define the limits of this odontogenic* portion ; it is, in fact, a substance similar in appearance to that which serves for the production of the bone and the other tissues of the face ; but, as soon as the solid tissue of the jaws can be distinguished, the situation and the extent of the formative organ of the teeth can also be perfectly recognised. Its limits are more and more distinctly circumscribed by the bones as they increase to form the maxillary grooves ; these bones then progressively surround the part where the teeth originate until such time as the formation of the grooves is completed.

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* *Odous* a tooth, and *gennao* to generate.

During the first period of intra-uterine life it is not possible to distinguish either the osseous partitions or the dental sac (pl. 1, 2, a a), it is only as the whole increases, and as all the parts of the face become changed simultaneously, that the partitions of the alveoli grow up and sub-divide the odontogenic mass.

These tardily formed partitions, like the rest of the maxillary bones, result from the transformation of the primordial molecules, in the midst of which the teeth have made their appearance.

When the transverse partitions grow up to form the alveoli, the formative organ of the teeth begins to be subdivided in the interior of the alveolar grooves. This new character does not again disappear; modified by the subdivision this part no longer appears to have the same dimensions which it had previously, but in reality its extent is the same—its form only is changed.

In proportion as this sub-division increases, the fibrous envelope of the teeth, which does not exist at first, becomes more and more definite until the time arrives when the dental sac is completed.

The formative organ having undergone this sub-division, each tooth then appears completely surrounded by an envelope terminated by a fibrous prolongation, to which various uses have been assigned. This prolongation has received the name of the *gubernaculum*, or conducting cord of the tooth; some writers have described a canal in the interior of it, which, however, does not exist.

At this time the teeth have become solid, and they present those details which have been so well described by many able observers relative to their three component substances, named enamel, dentine, and cement.

The molecular characters of each of these substances represent the last transformations of the primordial molecules; but the cement, which bears the greatest resemblance to bone, is the last to make its appearance.

So long as the tooth is deprived of its sac the cement cannot be discovered; in order that this may be seen the dental sac must be formed, the septa of the alveoli established, these septa covered with a fibrous layer analogous to the periosteum, and the formation of the root of the tooth must have commenced.

For the production of the cement it is necessary that the primordial substance should have taken on the characters proper to the periosteum. Before that period, it was the source of the dentine and the enamel; while during the last changes which it is destined to undergo, having assumed the appearance of periosteum, it engenders, by the transformation of its molecules, a substance in every respect similar to bone, and which is adapted to the completion of the tooth—this is the cement.

I proceed next to give a general description of the formative organ of the teeth. On examining this part more minutely, considerable interest attaches to that portion which is placed over the teeth, and which is, therefore, situated between these organs and the mucous membrane of the mouth. It is also this part which is contiguous to, and intimately connected with, the periosteum of the maxillary bones.

Already of some thickness when the teeth first appear (pl. 1, 2, a a), it continues to increase, especially in man, in proportion to the growth of the fœtus. This additional thickness regularly augments up to a certain period, which varies in different animals.

Increasing thus in volume and enlarging in every direction, this superficial part of the formative organ is so disposed as to form a true protective apparatus. Situated above the teeth, whose formation steadily progresses, it forms a kind of thick, dense, and elastic layer, which the scalpel divides with difficulty.

In proportion as the formative organ of the teeth becomes transformed by sub-division in the intra-alveolar spaces diminishes, and at length only appears as the membranous envelope which constitutes the dental sac; the superficial portion, on the contrary, progresses and acquires considerable thickness, until by a singular movement it begins to show indications of a continuous decrease.

It is during the last stages of the development of the teeth that these phenomena appear, and prepare the way for the eruption of the teeth.

The observations I have made warrant me in believing that the succession of these phenomena varies in each species of the mammalia.

In the horse, in whom the eruption of the teeth takes place soon after birth, the decrease in the thickness of this part commences during the last period of uterine life; it is much the same in the ovine and bovine species.

In man, this decrease only commences and progresses some considerable time after birth, towards the sixth month, often indeed much later, as towards the age of one year, when the child has been badly nourished and has been taken too soon from the breast.

There is a time when the superficial portion and the intra-alveolar portion of the formative organ are only connected together by the fibrous cords, which have received the name of *gubernacula*; it is then that the superficial portion seems to attain its greatest thickness in the human subject.

From this time the fibrous cords (*gubernacula*) waste away, shorten, and the thick, dense layer which separated the teeth from the mucous membrane loses its previous dimensions and becomes atrophied.

The contact of the teeth is not the cause of this phenomenon, for these organs are separated from the part which protects them by the entire length of the *gubernacula*, and also by the thickness of the dental sac.

This superficial layer has assumed the appearance of a membrane before the teeth have come in contact with it; it disappears previous to the time when the most prominent points of these organs have arrived at the level of the surface, which it covers. At different periods the same succession of phenomena takes place in each tooth; in the human subject, it occurs first in the incisors, next in the first molars, while the same superficial layer may still continue, for a long time, to protect the other molars and the canine teeth.

Disappearing in this manner, the superficial layer leaves no other trace of its existence than a small fibrous band which surrounds the neck of the tooth; this becomes confounded with the tissue of the alveolar periosteum, from which it cannot be separated.

This blending together of two organic portions, apparently so dissimilar, reproduces at this period that intimate connexion which united the formative organ of the teeth with the mass from whence the periosteum was destined to arise in the course of embryonic life.

I should observe that, at the time when this obliteration of the resisting fibrous layer which separates the teeth from the mucous membrane is most advanced, the latter also undergoes a similar diminution. It becomes thinner, the vessels which traverse it and the epithelium which covers it disappear, unless indeed the health of the infant should be deranged, and that under those circumstances the phenomena are altered.

All these changes take place before the contact of the teeth prepares for them an easy exit, unless any pathological conditions should have disturbed the order of events.

Fig. 1.

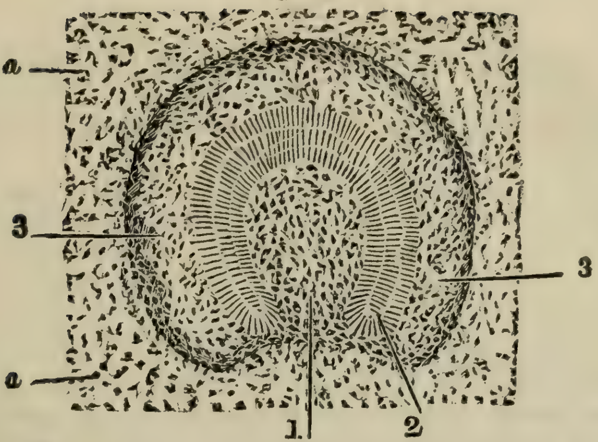


Fig. 2.

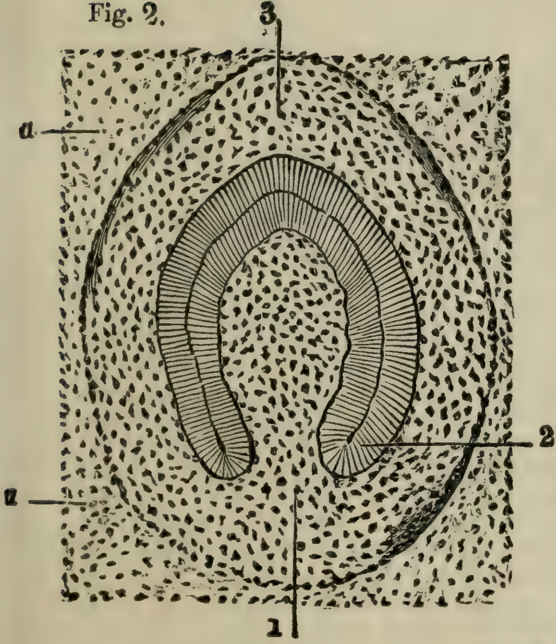


Fig. 3.

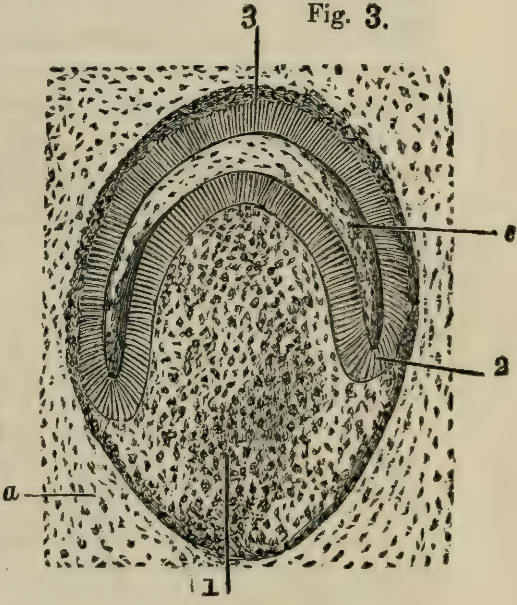
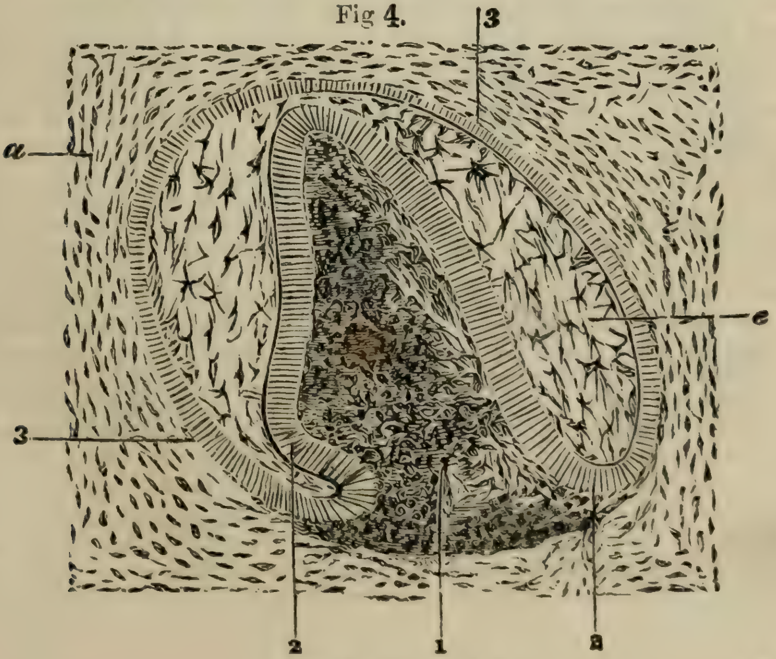


Fig 4.



[To be continued.]

AN HISTORICAL REVIEW OF DENTAL SURGERY.

FROM THE EARLIEST PERIOD TO THE COMMENCEMENT OF THE PRESENT CENTURY.

[*From Kurt Sprengel's " Geschichte der Medicin" (History of Medicine). Translated from the French of A. T. L. Jourdain, with critical and explanatory Notes.*]

BY A. HOCKLEY.

[Continued from page 284.]

AMBROISE Paré* successfully removed several tumours of the epulis kind which had attained an extraordinary size. This skilful practitioner desired that the operation should be performed without delay, otherwise the removal would be attended with considerable difficulty. Several instruments of his invention bear a near resemblance to those in present use. Of these are a specula oris, with screws for separating the teeth of persons attacked with trismus; several instruments for the teeth, made in the form of a goat's foot; and some forceps, resembling the pelican in shape.† In using these last he gravely cautions the operator not to extr teeth instead of one. He says, that when a patient w suffering from severe odontalgia which no remedies c appease persists in retaining his tooth, the actual cautery must

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* Paré, who has been justly regarded by French writers as the Father of Modern Surgery, was born in 1509, at Laval, in the province of the Maine. At an early age he commenced the study of his profession, and practised it with great zeal at the Hospitals of Paris, and afterwards in the Army which he accompanied during several campaigns in Italy. In 1552 he was appointed Surgeon in Ordinary to King Henry II, and held the same office under three successive monarchs, until his death in 1590. Paré, who was a Protestant, having rendered great professional services to Charles IX, owed his life to the personal friendship of that King, who, on the eve of the horrible massacre of St Bartholomew, sent for him and, observing that his life was too valuable to be sacrificed, kept him confined in his private chamber during the continuance of the massacre.

In his celebrated work on Surgery, an English translation of which, by Thos. Johnson, was published in 1634, Paré devotes several chapters to the consideration of the teeth, their diseases and treatment, the various operations connected with the teeth and gums, and the method of supplying by artificial substitutes those teeth that are lost. His opinions are somewhat curious. He describes the teeth as being harder and more solid than the other bones, and that they continue to grow during life time, for otherwise, he says, "by the continual use of chawing they would be worn and wasted away by one another," and he adds, "you may perceive this by any that have lost one of their teeth, for that which is opposite to it becomes longer than the rest, because it is not worn by its opposite." The growth of the teeth he attributes to the presence of a white glutinous humour in the alveoli, which are hollow, and that this humour is produced from the blood brought thither from the veins, nerves, and arteries of the third conjugation. Paré gives a very correct account of the various forms of the teeth, their uses, position, and connection with the adjacent structures; and he considers that the reason the upper molar teeth have more roots than those of the lower jaw is, that the lower jaw being much harder than the upper, the teeth receive greater support and are more firmly retained than those of the upper jaw, which as it were "hang out of their seats." The teeth, he says, are fastened in the jaws as a stake or nail, and that this adhesion is further strengthened with a ligament, which applies itself to their roots, together with the nerves and vessels.

† The accompanying drawings will illustrate the various forms of instruments used in Paré's time for the extraction of teeth. They are taken from his work on Surgery before alluded to, and in describing the operation of extracting teeth, he gives the following instructions:—" Therefore, for the better plucking out a

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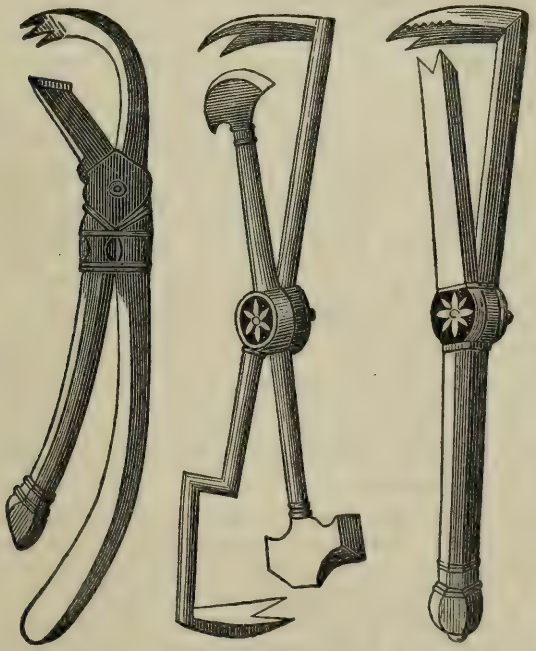
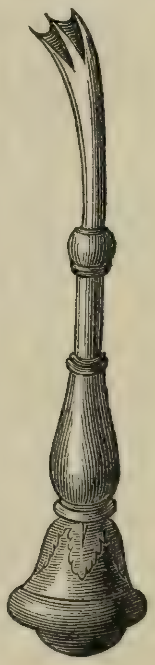
tooth, observing these things which I have mentioned, the Patient shall be placed in a low seat, bending back his head between the Tooth-drawers legs; then the Tooth-drawer shall deeply scarifie about the tooth seperating the gums therefrom, and then if spoiled as it were of the wall of the gums, it grow loose, it must be shaken and thrust out, by forcing it with the three-pointed Levatory (Fig. A); but if it stick too fast, and will not stir at all, then must the tooth be taken hold of with some of these toothed *forcipes* (B C D); now one, then another, as the greatness, figure, and site shall seem to require. I would have a Tooth-drawer expert and diligent in the use of such toothed Mullets; for unless one know readily and cunningly how to use them, he can scarce so carry himself, but that he will force out three teeth at once, ofttimes leaving that untoucht which caused the pain."

Figs. B C D



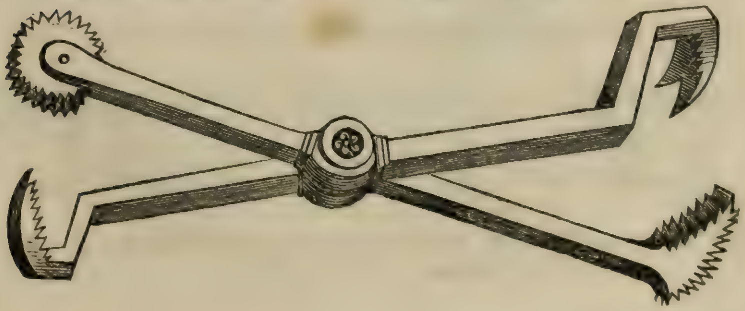
The Effigies of FORCIPES, *or Mullets.*

Fig. A



A three-pointed Levatory for the Drawing of Teeth.

The form of another Instrument for Drawing of Teeth.



be employed. He advises that when the teeth have been shaken by a fall or a blow, extraction should be avoided, as, by securing them by a thread to the adjoining teeth which are firm, they may in time acquire their original firmness. But when the teeth become loosened by age, it is impossible to restore them to their former stability. Paré is the first to describe the operation of transplanting, and relates the case of a lady, who having lost one of her front teeth, had it replaced by a similar one extracted from the mouth of her femme de chambre, which tooth became so firmly fixed as to serve all the purposes of the original. But he expressed his abhorrence of such a practice, and desired that recourse should be had to his artificial teeth made in bone or ivory, which were secured by means of gold or silver threads.* He was persuaded that the presence of worms in the teeth was the principal cause of caries, and recommends the use of a file in preference to any other means for removing the decayed portion. He considers extraction necessary when the patient suffers considerable pain, and there is fear of the decay extending to the adjoining tooth, but that the operation should be performed with skill, lest the jaw, the eye, or the brain be injured. Before operating the patient should be seated on the ground, the gum separated from the tooth, and the latter well shaken, but sometimes the tooth is so firmly fixed that it is necessary to break off the crown, and to destroy the sensibility of that portion which remains with caustics. After a tooth has been extracted the blood should be allowed to flow, previous to closing the gum with the fingers. Paré is also the first, to my knowledge, who recommends scarification of the gums in difficult dentition,

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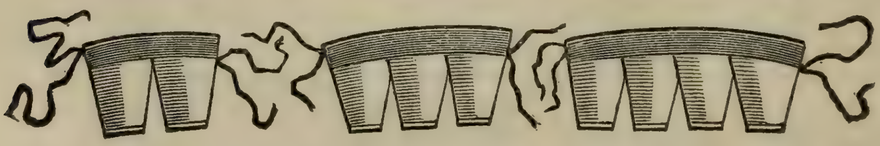
* It oftentimes happeneth that the foreteeth are moved, broken, or stricken out of their places by some violent blow, which causeth deformity of the mouth, and hinders plain pronunciation. Therefore, when the jaw is restored (if it were luxated or fractured) and the gums brought into their former hardness, other teeth artificially made of Bone or Ivory may be put in the place of those that are wanting, and they must be joined one fast into another, and also so fastened unto the natural teeth adjoining, that are whole; and this must chiefly be done with a thred of gold or silver, or for want of either, with a common thred of silk or flax, as it is declared at large by *Hippocrates*, and also described in the Figure following.

The Figure of Teeth bound or fastened together.



The works of that famous Chirurgeon Ambrose Parey. Translated by Thos. Johnson. London, 1634.

and he performed the operation for the first time on his own child, and with considerable success.

Antonio of Altona distinguishes the various forms of odontalgia according to their origin, and indicates numerous remedies for their treatment, yet the only remedy he advises for teeth which are decayed, discoloured, or loosened, is extraction.

J. André de la Croix cured a fistulous abscess of the jaw by the removal of a tooth which was scarcely decayed. Flajani considers that this is a very early example of a cure being effected by the removal of a tooth which had perforated the antrum, but his opinion is without foundation.

Achille Pirmin Gasser extracted one of his own teeth in such an unskilful manner that he removed a portion of the alveolus with it, hæmorrhage followed to such an extent that he became pallid, and continued so for the remainder of his life.

In the treatment of abscesses of the parulis kind, J. C. Aranzi, like the ancients, advises that they be allowed to point previous to their being opened. Those of the epulis kind he preferred to remove with caustics or the actual cautery.

Peter van Foreest was the first to observe, by experiment on himself, that the luxation of a tooth sometimes sufficed to remove the toothache ; but that the relief afforded was only temporary, and that to effect a cure, recourse must be had to extraction. He is also the first who informs us that the wearing of artificial teeth, secured by gold threads, may cause violent inflammation of the gums and mouth. We find also in his work the first description of the pelican, although this instrument had been in use for a considerable period prior to his time; he, however, condemns its use, as exposing the teeth to fracture, and proposes to substitute for it an instrument formed like the hoof of an ox. With the latter instrument he removed several teeth, whose diseased roots had produced fistulous abscesses of the gums, one of which opening into the cheek, threatened to cause disease of the maxillary sinus, this, however, he succeeded in preventing by the removal of a decayed tooth. This writer maintained that worms existed in the teeth, and that they were engendered there, as well as in the intestines, ears, &c. Foreest, following the instructions of his master, Benoit Faventin, advises that teeth which are painful should be perforated with a small trephine. He also considers that, prior to performing the operation of extraction, the gum should be cut around the tooth; and to show the indispensable necessity for this precaution, he mentions a case where, from its being neglected, the jaw-bone was fractured.

Fabricius of Aquapendente successfully removed by excision several tumours situated close to the molar teeth, and afterwards applied the actual cautery to the wounds. He also cauterized the gums when much swollen, the cauterium for that purpose being made very thin. He employed several instruments for distending the jaws of persons attacked with trismus; but, because of the possibility of injuring the brain, he recommends their being used with prudence and caution. Fabricius stopped decayed teeth with leaf gold, previously preparing the cavities by burning them with oil of vitriol, or a hot iron wire passed through a small tube into the tooth. He extracted without any hesitation such teeth as were loose, painful, decayed, or fetid. For the extraction of molar teeth he used the pelican adapted to either side of the mouth; for the front teeth an instrument shaped like a crow's bill, and for the roots of teeth the *Cagnoli*, an instrument which acted with even greater force than the pelican. Respecting artifical teeth, Fabricius says nothing more worthy of note than is to be found in the works of his predecessors.

Fabricius Hildanus, by the application of caustics, removed a swelling of the gum which was formed beneath the posterior molar teeth; during the operation he kept the mouth open by means of small wooden wedges fixed to the teeth with iron wire. He cured a case of violent hemicrania by extracting four molar teeth, the diseased roots of which had caused the malady. And he succeeded in removing a fistulous opening in the gum which had lasted for fourteen years, by extracting a diseased root which occasioned it. Having, with Claudius Deodatus, surgeon to the Bishop of Basle, witnessed the effects of aqua-fortis (then so generally applied to caries and diseases of the teeth) in causing the destruction of the teeth, and even the rotting of the jaw-bone, he recommends, with the exception of numerous dentifrices, simply a general treatment for diseased teeth. This practitioner relates a case where he removed a cancerous epulis which had formed on the external side of a canine tooth; having prepared the patient for the operation he passed a thread across the tumour to enable him to hold it, while with a small curved bistoury he excised it close to the bone.

Although the opinion that a tooth can be ejected from its alveolus by the action of medicinal substances had been often refuted, it found many supporters. Thus, the advice given by Jean Heurnius is never to attempt the removal of a tooth but by introducing some euphorbium between it and the gum, after which the tooth will always loosen without pain. He also cautions persons to be careful of the dentists, and not to be in too great a hurry to apply to them, because frequently odontalgia proceeds from internal causes with the treatment of which they are unacquainted.

J. S. Strobelberger appears, however, to have had a more favourable opinion of the profession, as he advises that, when a tooth is to be extracted, a skilful dentist should be consulted, because the operation requires a dexterity which can only be acquired by constant practice. He recommends numerous remedies for the toothache, and among others the smoke of tobacco, which had then just become known. He used oil of vitriol, or the essence of frogs, for killing worms in the teeth; and notwithstanding he thought that charms had no other power than acting upon the imagination, he did not doubt that the toothache could be relieved with a toothpick dipped in the balsam of Paracelsus, and that teeth may be made to fall out by the employment of certain odontalgics. He indicates, besides, several precautions to be taken in extracting teeth, and recommends that recourse should not be had to the elevator and forceps, until after the attempt to remove the tooth with the fingers, or by a thread tied around it, has failed.

M. A. Sévérino removed several tumours of the epulis kind with the bistoury, and afterwards burned the wounds. By opening it he cured a large abscess caused by the eruption of a wisdom tooth. And, with forceps made in wood, he extirpated a large tumour of the lower jaw. Dupont was the first to advise, as an excellent remedy for the toothache, the extraction of the tooth and the replacing it in the socket immediately after, as it would at once contract a fresh adherence to the surrounding parts of the alveolus, and thenceforth cause no further pain. This was confirmed a short time after by Denis Pomaret, who states that he saw a perfectly sound tooth, extracted by a surgeon in mistake, placed back into its alveolus, and that by the use of styptics it afterwards tightened.

Nicolas Tulp proved, by the history of a physician of Amsterdam, named Goswin Hall, that incision of the gums, as recommended by Paré, has not always a success equal to that which it met with in the hands of Sévérino—at least when recourse is had to the operation in order to assist the eruption of a wisdom tooth. Hall, tormented by an insupportable pain produced by one of these teeth, ordered several incisions to be made, the result being that the pains continued to augment, fever supervened, accompanied with delirium, and shortly afterwards he died.

[To be continued.]

CHEMISTS AND DENTISTS.

In the early part of the past month, the public and the dental profession were enlightened by a description of the manner in which dental surgery is conducted by some chemical dental practitioners eastward of London.

Notwithstanding that the facts have already been made public by means of the daily press, it is quite necessary that the profession should possess, among its own records, some account of a case, the like of which fortunately does not often happen, but which should be remembered by the profession and the public, as a caution to both. To the profession—as to the estimation in which a jury may hold a careless or unskilful practitioner, and to the public—as to the care necessary in the selection of a person into whose hands they may with safety commit their aching jaws.

The following is an outline of the case as it appeared in the public prints.

DERRICK v. CROUCHER.

BREAKING A MAN'S JAW IN EXTRACTING A TOOTH.

The plaintiff in this action, who is a dock labourer, sought for compensation in damages for injury received through alleged want of skill, &c., on the part of the defendant, who is a chemist and a tooth extractor in the Ratcliffe highway. The plaintiff stated that, on the 2nd of February last, between six and seven o'clock in the evening, he entered defendant's shop and applied to him for relief, as he was suffering very much from toothache. Having sat down, defendant examined his mouth, and discovered an upper molar that was decayed and required extracting. The defendant then stood behind him and placed an instrument like a corkscrew into his mouth and *pulled*, but the tooth did not come out, although he thought that his head was coming off. Defendant had six or seven pulls at the tooth, but did not pull it out. Each time plaintiff's mouth was full of blood, which he washed out with water. He thought he heard something snap at the fourth pull, but the last pull gave him most pain, and he fouud that he was unable to shut his mouth, from what he thought at the time was a projection of the tooth. The defendant then said, "Dear me, it is dangerous, I can't see to pull it out to-night; I shan't charge anything, but come again to-morrow morning at ten o'clock." Plaintiff said he was in much pain, and wished to have it taken out that night, but the defendant declined doing any more. He went home and felt faint from loss of blood, but at his wife's request he accompanied her to the shop of a Mr Crutcher, another chemist and tooth extractor, in the same neighbourhood, who examined his mouth and said the jaw was broken, and having with a lancet cut away the gum he took out two teeth and a portion of the jaw; one of the teeth decayed, the other one perfect. Plaintiff was very unwell for some time, and unable to work for a month, during which time he was compelled to live on soft food on account of the tender state of his mouth. Mr Crutcher, the *successful* chemical tooth extractor, with two medical gentlemen and a dentist, were called, and gave it as their opinion that the injury had occurred through want of skill on the part of the defendant.

The defendant was called in his own defence, and stated that he had practised as a dentist for thirty years, and that Mr Crutcher had been his assistant for seven years, and had commenced business close to him. When plaintiff came to him, he (defendant) advised him not to have his tooth out until the morning, but as the plaintiff was not willing to wait, the defendant placed the key in the mouth and had but *one* pull at the tooth, but finding it firm, he desisted, and after examining the mouth and finding that the tooth was quite firm, not having given way in the slightest degree, he advised him to go home and bathe his mouth, and return in the morning. He had used every care, and the plaintiff at the time seemed satisfied. Plaintiff afterwards returned and showed him the fractured bone and the two teeth that had been taken from his jaw. The defendant admitted that *whoever* had cracked the bone must have acted unskilfully.

The defendant's son was called, and stated that his father only applied the key once; he examined the mouth afterwards and found the teeth and jaw quite firm.

Several witnesses were in attendance to give evidence for the defendant, but the learned judge said, "Every man was bound to bring a reasonable amount of care and skill into the practice of his profession, and it would be for the jury to say whether or not the defendant had done so.

The jury returned a verdict for the plaintiff; damages, 10*l*.

It will be seen, in the perusal of the foregoing little sketch, that there was on the trial quite an average amount of hard swearing; the principal facts, however, are pretty clear—first, that Mr Derrick got his upper jaw fractured and lost two teeth instead of one; second, that this unwished for result was produced by the joint operations of two chemical gentlemen who practised tooth-drawing; and third, that the first chemical gentleman had to pay ten pounds for the damage done to Mr Derrick's jaw.

It is, however, somewhat difficult to decide to whom the merit of *cracking* the jaw rightly belongs, supposing all the parties to be equally respectable; for the plaintiff says Mr Croucher had six or seven pulls, and that when he, the plaintiff, left Mr C.'s shop, he could not shut his mouth. Mr Croucher declares that he only had *one pull*, and that he examined and found that all was right in the mouth, and the son of Mr Croucher confirms his father's evidence. The evidence on the opposite sides is directly contradictory, agreeing only in *one* particular, viz., that the plaintiff WAS pulled. The next thing to be learned is that Mr Crutcher (the second chemical gentleman, late assistant to Mr Croucher), declared, as soon as he examined the mouth, that the jaw was broken, and that he cut away the gum and *took* out two teeth and a portion of the jaw-bone; but it does not appear *what instrument* was used for taking out the two teeth, &c.; had it been stated distinctly what instrument, in *addition* to the lancet, Mr Crutcher used for the removal of the teeth, it would have been more satisfactory. The jury, however, seemed satisfied that Mr Croucher was the faulty operator, and gave their verdict accordingly.

Then, admitting that the verdict was a correct one, we learn this fact, that it is possible for a man to use an instrument for thirty years, and yet not know how to use it *properly*. If any persons suffering from toothache can appreciate this fact, they will hesitate before they allow their unfortunate aching jaws to be *pulled* by any pretender who is willing to have a pull; and if tooth extractors can appreciate the same fact, coupled with the verdict in this case, they will understand that a jury will not accept even thirty years' practice as a justification for cracking a jaw-bone.

Truly, there is much wisdom to be learned from this trial between Derrick the pulled and Croucher the puller.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOLOGICAL SOCIETY OF LONDON.

The last Ordinary Meeting of the Session was held at the Society's Rooms on the evening of the 4th ult., Arnold Rogers, Esq., in the Chair.

Mr Lindsay, of Dover, presented a model of a new kind of drill.

Messrs Ash and Sons exhibited specimens of teeth adapted for the vulcanite base, also specimens of vulcanite prepared in Mr Child's apparatus.

Mr Maclean, of Conduit street, exhibited a cast representing a case of tumour of the alveolus. The patient, who had previously consulted two professional gentlemen, but without any good result, applied to Mr Maclean, who gave his opinion that the tumour was connected with the external fang of the anterior bicuspid. This he removed, and in about three weeks or a month the enlargement of the alveolus had entirely subsided.

Several members having been duly elected, Mr Childs read a paper on SUPER-HEATED STEAM. The paper, which was of a highly scientific and instructive character, was listened to with great attention; and at its conclusion a vote of thanks to Mr Childs was carried by acclamation.

The President, in adjourning the Society to November next, observed that it was in contemplation to change the day of meeting from the first Saturday to the first Monday in the month—the Saturday not having proved so convenient a day as was hoped—and that to effect this change a Special General Meeting would be held, of which the Members would receive due notice.

In consequence of the editorial remarks of a contemporary, relative to our publishing the proceedings of the above Society, we are called upon to state that the reports of the Odontological Society have been published in this Review, as received officially, in reply to a request made by us, from the Hon. Secretary of the Society. It is true that the Hon. Secretary has forwarded us such reports regularly through the medium of our contemporary, and that we have printed from the reports thus sent. In so doing, however, our impression was that the reports were also furnished to our contemporary by the Honorary Secretary of the Society, and that he, in sending the printed matter to us, did so to save the trouble of writing out a second copy. We shall regret if we have been mistaken in this respect; from henceforth one of our own contributors will furnish us with the reports of the proceedings of the Society. [Ed. DENTAL REVIEW.]

COLLEGE OF DENTISTS OF ENGLAND.

LECTURES ON THE MEDICAL HISTORY AND TREATMENT OF DISEASES OF THE TEETH, AND THEIR ADJACENT STRUCTURES.

By BENJAMIN W. RICHARDSON, M.D.,

Licentiate of the Royal College of Physicians; Physician to the Royal Infirmary for Diseases of the Chest, and Lecturer on Physiology at the Grosvenor Place School of Medicine.

LECTURE VIII.

THE HISTORY OF MALIGNANT DISEASES INVOLVING THE ORGANS OF MASTICATION.

[*Delivered on January* 18, 1859.]

Mr President and Gentlemen,

In the diseases affecting the organs of mastication which have up to the present time passed before us, we have met with none as yet which can be designated as inevitably fatal, despite the full resources of our science. To-night it is our task to consider a class of disorders on which death fattens, and before which the ablest science languishes helplessly. A sad task this, then, yet one which on account of its weight is the more enthralling.

The disease is, and is fatal, by and from our ignorance. We are striving hard to remedy that ignorance, and we must strive more. The labours of the medical body during the last twenty years have indeed been very remarkable in regard to malignant diseases and their causes. Much has been determined as to the character of a malignant growth, and if nothing affirmative has been discovered as to the cause, much even in this direction has been learnt of a negative value. We have learnt, *i.e.*, what are *not* causes. As I would do my best to set you all thinking deeply on the subject to be brought forward to-night, I shall not hesitate to place briefly before you the principal facts which have been brought to light by the labours to which I have referred.

By the term malignant diseases is conveyed in one general expression the diseases known commonly as cancerous diseases. They are not a wide group, indeed it is in a strict sense incorrect to speak of them in the plural number. There is, in a word, but one disease. The external form in which the disease manifests itself may vary, and upon such local variation we have a reason for certain names, after the same fashion as that by which we designate this man a negro, and that man an albino. But the disease is essentially one throughout, having the same general cause, symptom, course, and termination.

The essential nature of the disorder, in so far as it is presented to us, consists in the establishment in some part of the body of a series of new processes, consisting: First, in the formation, in the part affected, of a product foreign to the part; secondly, in the destruction of the normal structure of the part; thirdly, in the steady elimination from the part of a fluid or semi-fluid substance, derived from the blood; and fourthly, in the exhaustion of the system to its death from the constant loss to which it is subjected.

There is in regard to the body, as in regard to many other systems less complicate and better understood, one great law easily explained—the law, I mean, of supply and demand, or of supply *versus* demand. In the body the supply must equal demand; the wasting tissue must be proportionately made up. Let this law be broken by ever so little, let the waste by ever so little be always greater than the nourishment, and the result is in the end inevitable. Time may be required for a marked change to be developed; but time is certain, and so is the result in the time, sooner or later the disproportion between the waste and the supply is felt, then the whole system fails, then the end must come.

Attach no superstitious notion or mythical idea to cancerous growths. They kill by virtue of their interference with a simple physical law. Banks break by interference with the same law, and nations fail. If in the grand universe the same law were broken, all organic life would fail, and mother earth would be childless. The cancerous growth is not peculiar to any one structure of the body. It may be developed in gland, it may occur on mucous or cutaneous surface, it may occur in bone; and the three positions here noted are those in which it is most frequent. Nor is it peculiar to one special age, though it is most so after the age of thirty, and goes on after this increasing till old age; it has been known, however, to affect the infant before its birth. In the 'Medical Times,' vol. xxi, p. 368, for the year 1850, there is the report of a case by Mr Griffiths, in which a child, whose parents were apparently free from cancerous disease, was born with a tumour presenting near the left eye. The tumour, soft and pendulous, was of the size of a hen's egg, it involved the eye, and externally was highly vascular. The tumour grew rapidly after birth, the skin ulcerated, there was discharge of fœtid pus and of blood. The glands of the neck enlarged, and several bad swellings formed on different parts of the body. The infant died in convulsions at the end of four weeks, and the tumour, which is retained in the museum of King's College, showed all the ordinary characteristics of malignant disease. It weighed seven ounces and six drachms. The brain and lungs were healthy, but the liver and left kidney contained malignant deposit.

A similar case is given in the 'Journal des Progrés,' tome xiv, by M. Tormele. The parents in this instance were free from cancerous disease, but the father was an old man, over eighty years of age. The cancerous tumour, which was of the kind known as fungus hæmatodes, was attached to the right parietal bone of the skull; it involved the osseous tissue, and perforated, but did not affect, the dura mater or membrane lining the cranial cavity. The child was born dead, and the brain was found soft and infiltrated with blood.

It has been observed too, by most writers, that age stamps in some measure the character of the cancer mass. Thus hard cancer is most frequent in old persons, soft and bleeding cancer in the younger. But there are exceptions to this rule.

The disease is ordinarily more common amongst women than men; this remark applies rather to cancerous formations altogether than to particular forms of cancer. In relation to some special varieties of malignant growth, the prevalence might, I believe, be traced to the male side of creation.

The disease seems to pervade all classes of living animals. It is common to dogs, it is common to many of those domesticated animals which we take as food; it even occurs in fishes. Dr Edwards Crisp once caught an enormous pot-bellied pike. He found the great size was due to a large fungous growth.

The characters of malignant tumours have been examined both chemically and microscopically, and subject to certain modifications resulting from position and stage of disease; the physical characters are pretty well understood. The tumour generally presents a fibrous basis, which is infiltrated with cells, nuclei, and cancer juice. There has been recently great discussion in the scientific world on the point whether or not there is any specific cancer cell. It was assumed some years ago that a peculiar cell called " candate " was diagnostic of a cancer growth. This view, after much discussion, has been set aside. Dr Henry, in a very able paper on this point, says:—" That he should rather be guided by finding cells in situations where they ought not to be, than by finding any special cell. But if there is one cell more diagnostic of cancer than another, it is a large parent cell, with from three to five smaller ones in it." The cancer fluid is a creamy fluid which pervades the whole structure, from which it may be squeezed out by pressure, and contains the cells of which I have spoken.

These parts, consisting of the cancer cells, nuclei, and juice, give the softness to the cancer's growth, while the fibrous tissue or struma constitutes the basis or skeleton work of the tumour. Hardness or softness of cancer thus depends in great part upon the relations in the tumour held by the fibrous basis and the infiltrated fluids.

The whole of these parts, again, are originally derived from an albuminous yellow fluid, which, eliminated direct from the blood, permeates all the tissues of the part, and yields the materials out of which the after structure is supplied and built up.

According to the general characteristics of the malignant growth, names are applied to it, mapping out the disease into its so called varieties. Thus in some examples the growth is hard, and the tumour is known by the term, schirrus, or hard cancer, the cancer most commonly affecting the heart and osteoid. In other cases the tumour is soft and spongy, or cheese-like, or very vascular, and to this variety the term medullary or soft cancer is applied. In a third class the cancerous product presents a surface of an ulcerative type, or, I had rather said, of a vegetative type, and such cancer is called epithetical, or villous. In the fourth set the tumour exists as a gelatinous mass, and is known as the colloid form of malignant disease.

This, however, may be stated, in reference to all these varieties, that they all have a common nature, and that they are susceptible of transformation, the one into the other. In all, a process of elimination or excretion is always present; in all, the tumour is highly vascular; in many instances the character of the tumour is simply modified by the infiltration into it of some matter or colouring principle derived from the blood. Thus, there is a class of cancer known as the dark or melanotic cancer, which derives its dark peculiarity simply from the circumstance that the tumour is infiltrated with a dark pigmentary substance derived from its vascular supply.

I have said that the structure of the cancerous growth has been studied chemically, but I regret to add that chemistry has as yet thrown but little light on the disorder. L'Heretier made three analyses of schirrus, and found many of the blood constituents, as water, albumen, fibrine, gelatin, fat, phosphorised fat, peroxide of iron, yellow pigment, and salts. Other analyses are certainly required, conducted on a new and a more determinate principle, but for these we must bide our time.

The local characters of a malignant growth then are, in short, the development of a new growth, attended by infiltration of fluid matter derived from the blood: a tendency on the part of this growth to ulcerate; and a tendency to continue giving out a fluid without any approach towards reparation.

In addition, there are some other local signs, very marked in character. One of these is *pain*. The pain arising from cancer varies according to the character and varies as to cause. In schirrus, or hard cancer, the pain from the first is excruciating. A deep, frequent, lanceolating pain, which no sedative relieves, and which occasionally takes place in paroxysmal periods. In other cases the pain, less intense, is dull and heavy. When the pain is lanceolating, it is due usually to interference with the nerves by which the part affected is supplied. When it is dull and diffuse, it is due, at least in part, to pressure and to encroachment by the diseased mass on neighbouring structures.

There is, further, one general sign which is always considered as indicative of the existence of cancerous disease. This is called the cancerous cachexia. Its signs are, a prostration of energy; often an unusual irritability of mind; a striking dusky yellowness of skin; these symptoms go on increasing until in wasting and pain the end arrives.

There are different views as to the position of this general sign in relation to the local manifestation. Common observation places it as preceding the local disease. Common observation leads to the opinion that the cachectic state of the cancerous patient is the outward and visible sign of a general systemic derangement, upon which the cancer growth is engrafted. But it is fair to say that in some instances the cancerous cachexy is secondary in its appearance to the local disease, and that a few authorities of weight are inclined to consider the cachexy as the representation of the local disease; in the same manner as the exhaustion, the sweating, and the emaciation of consumption are the sequences of the local pulmonary affection.

To return to the local malignant disease; a various number of theories have existed at various times and amongst different men as to the nature of the affection.

Adams, Bacon, and Carmichael held a view that the disease was of hydatid growth. That is to say, in simplest terms, that the growth was a low form of organization, in which true and independent organized animals of the entozoa kind were produced. Modern microscopical science has done nothing but negative this hypothesis; there is, in a word, no ground for retaining it longer except as a curiosity in literature.

Broussais, Wenzel, Breschet, and many more, have assigned the malignant growth to an inflammatory source. In the part affected there is originally, argue these, inflammatory mischief, and the local changes are the upshot of this inflammation. It can only be said in reference to this once widely extended view, that in accordance with our modern and more definite knowledge as to the nature of the inflammatory process, there are no points of analogy offered between simple inflammation and its results, and the formation of a cancerous mass and its consequences.

A third theory has been offered which in plain terms suggests that the cancer matter is derived from the blood. The affected part is infiltrated with a diseased plasma, which has a tendency to new or vegetative growth. This view at all events supplies a reason for the constant supply of the disease and for the exhaustion which succeeds. But it is not consonant with all the facts; for as yet no definite diseased condition of any part of the blood has been discovered either by the microscope or by chemical investigation.

A fourth theory may be called the glandular theory of the disease. This assumes that the diseased part takes on glandular functions; that it secretes from the blood supplied to it the malignant material; that the cancer mass is in reality an excreting organ; and that it removes from the body at large the cancer poison.

A last view which has been maintained is, that the blood is healthy and that the disease is purely local. That on the part affected, and not elsewhere, the plasma of the blood supplied to the part is subject to special transformation into the new and destructive tissue. Against this hypothesis must be urged the recurrence of cancer after extirpation, and the fact that cancer arrested in one part of the body will often appear forthwith in another.

Taking all the facts together, the sum and substance of cause seems to be this—that there is in the cancerous subject a specific poison which fixes on certain particular organs for the development of its effects, and which is derived from, or at least caused by, the blood.

This view is supported by many proofs. I will sketch out a few of these.

1. There seems to be no doubt on the point that the cancerous diathesis is hereditary in its nature. It passes from parent to offspring. This indicates that the disease has for its base a general predisposing condition of body.
2. When the disease has once been developed it continues. If it be removed from one structure it breaks out in another. You remove a schirrus breast in an early stage, and in so far effect a temporary cure. Time passes, and by and by the other breast is similarly affected. You remove this, and then some other part takes on the morbid action. There could scarcely be adduced a more logical proof of a general systemic origin of the local lesion.
3. If the diseased product were simply of local origin, the inference is that the disease might be propagated by the mere act of introducing into healthy animals portions of the diseased mass. Many experiments based on this supposition have been tried and failed. Alibert even inoculated himself with cancerous matter and suffered nothing. Dogs have been fed on cancerous matter and have suffered nothing; various other animals have been inoculated with cancer matter and have suffered nothing; and as Dr Aitken aptly observes, "neither has the disease been known at any time to result from accidents incident to the examination either of the living or dead person."

Yet, in regard to this last-named question of propagation by inoculation, I would remark on certain sources of fallacy which may have crept into the argument. I think that sufficient attention in the performance of these experiments has not been paid to the following circumstances: To the selection of animal operated on, and to the selection of part in which to perform the operation. It is clear that cancer matter selects special points for its effects. Therefore it would be right to select in the animal the same part of the animal as that from which the cancer matter was removed in the affected animal.

It would also be right to use animals of the same kind in the performance of these experiments, *i. e.*, if dogs are used to select a dog suffering from cancer as the subject from which to remove the cancer matter, and to inoculate another and healthy dog, and not any other animal.*

The corrections in the way of experiment are the more required because there now and then occur cases in the human subject in which contagion appears as if it had been a cause; at least there are some very singular coincidences of this kind. Thus, I have myself recorded a case, in which a man who suffered from epithelial cancer of the urethra, appeared to communicate the disease to his wife: both having the disease and both dying from it, the woman having it last and living the longest.

I have enumerated already in these descriptive generalizations many of the symptoms of cancerous disease; the pain, for instance, and the general cachexia. But there are one or two more observations relating to the course of the symptoms and their origin, which must be considered in an attempt, however brief, at systematically teaching the phenomena of this malignant disorder.

It may be remarked, then, that the disease at its onset is often excited by causes of the most trivial character. I have known in the female simple uneven pressure of the stays excite the mischief in the breast. A blow will often prove an irritant in the like manner. But the local evil, though thus excited, will sometimes long linger in the early stages. A hard swelling is produced, or a soft thickening is produced, and that is all that can be said; the patient is perhaps alarmed and consults his or her medical man, but the medical man, though his suspicions may be aroused, cannot in every case, nor perhaps in the majority of cases, be expected to affirm positively that the disease is of malignant growth.

In time, if malignancy is the fact, the tumour becomes painful, and increases in size; and with that pain there is usually associated the first indications of the cachexia of which I have spoken. The face is wan and careworn, the skin of yellow or bronzed cast, the muscular outline is softened down, and the mind is full of forebodings of bad days to come. A kind of hypochondriasis is one of the great signs of this disorder, and this depressed mental condition is not due to the patient's knowledge as to the fatality of cancer, but to some condition peculiar to the system, and to the nourishment of the mind's organ—the brain. The hypochondriasis may occur in fact, although the patient may be ignorant of the circumstance that the cancer growth has hold of him. The course which the cancer growth takes varies considerably according to the nature of the tumour; but this is the ordinary fact, that the cancer fluid infiltrated into parts and organs under the skin or under the mucous membrane, goes on increasing until ulceration is the result. The surface covering in the original tumour gives way, that is to say, and the cancer structure is exposed. If the cancer belong to the hard variety—*schirrus*,—a long process of ulceration is to be expected, and if the mass be in the neighbourhood of lymphatic glands, these become involved from the disease taking its course in the line of the lymphatic vessels. If the mass is of the soft variety of cancer,—*medullary*,—it projects as a vegetative substance, sometimes encysted; it easily bleeds, it yields a constant discharge, it sloughs, and is commonly of very rapid growth. If it is of the *epithelial* variety, the ulceration, which may start from the smallest point, as from a wart or mere nodule, extends circumferentially over a wide surface, from this surface there is a continuous discharge of an ichorous fluid; the margin of the ulcer is everted and modulated, and over the surface are nodulated growths. After the cancer mass has softened a white dense liquid can be obtained from parts of it by firm pressure, a sign which is strikingly characteristic. This form of cancer partakes in many respects of the forms of both hard and soft cancer. But it is less painful than schirrus, less rapid in its development than the soft cancer, and, as a general rule, less speedily fatal than either.

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* Since the above was written I find that the precaution here specified has been provided for in some experiment conducted by Mr L. Lawrence in conjunction with Dr Harley. The results were equally negative.

But in any case, as the local disorder progresses the general disorder or cachexia increases. The appetite becomes capricious, the nights are passed in pained sleeplessness, and death advances and occurs as the final restorer of the diseased body into its place in the organised and living creation.

I have observed already that cancer may attack a variety of structures; it may therefore as a necessity attack various organs, since organs are but compounds of structures. Hence cancer growths have a wide range; they occur in glands, as in the breast or liver; in bone; in the stomach; beneath the skin; beneath the mucous membrane of the mouth; in the nasal cavities; in the serous cavities.

In the practice of dentistry, however, the cancer growth is met with as occurring only in a limited section of the body; viz., in the maxillary bones; in the nasal cavity; and beneath the lining mucous surface of the mouth and lips, and on the tongue.

It will be our task now to trace out with some care the symptoms special to these forms of malignant disease.

In my last lecture I explained that two kinds of disease of non-malignant character were occasionally seated in the antrum; these were, first, excessive production and accumulation of the mucous secretion of that cavity; the second, accumulation of purulent secretion. There are two other affections which may occur here; the one non-malignant and the other the malignant disease, which is at this moment under our consideration.

Malignant growth occurring in the maxillary cavity may assume two of the varieties of cancer which I have already described: viz., the hard cancer—schirrus,—and the soft; or—medullary—cancer. As, however, the new growth is, in either case, covered in by bone, the diagnosis is exceedingly difficult as between the one form and the other, and indeed difficult at first even in reference to the fact of non-malignant or malignant disease. The record of a few excellently narrated cases, one by Mr Ferrall, and one by Mr Lyon of Glasgow, and one or two other observers, afford me the best means at command for epitomizing the leading diagnostic facts. Malignant disease of the antrum, ordinarily, does not occur before the middle period of life; the first symptoms are often referred to the teeth; there are frequent attacks of acute odontalgia accompanied with pain and throbbing in the cheek. These attacks, continued for a few weeks, are followed by swelling of the cheek, and it may be by an occasional discharge of blood from the nose. The symptoms, not uncommonly, are quite disregarded until such time as the face becomes distorted by the swelling, and the pain from tension becomes unintermitting. In time the tumour occupies the greater part of the region of the maxillary bone on the side affected, and if the swelling be permitted to progress the eye becomes encroached on by the increasing mass, the distance between the inner angle of the eye and the nose is materially widened, and at this point the tumour beneath throws up a rounded projection. The canine fossa is also filled up, and the alæ of the nose is drawn down and elongated. The nasal organ along the whole of the affected side is flattened so as to seem continuous with the surface of the raised cheek. At this stage the bone beneath having been removed by the pressure at the points least resistant may give way and the tumour may protrude at such points, thus projecting either externally near to the eyeball, laterally into the nasal cavity, or interiorly into the mouth.

There is now free discharge of fœtid matter, particularly from the nasal cavity, or at times there is hæmorrhage; while, enveloping all the symptoms, the body is affected by the well-known cachetic disposition of cachexia. The disease thus manifested, soon runs towards its fatal course, and admits of no ready error of diagnosis. I have sketched out in the above description the schirrus form of disease. In the soft or medullary form of cancer of the antrum there are some points of difference.

In these cases the disease commences with acute pain of the cheek, extending to the forehead, and is followed by rapid enlargement of the cheek; hæmorrhage from the nostril is often profuse, and a swelling occurs in the nose which may readily be mistaken for polypus. As the swelling progresses pressure upon the eyeball and disfigurement of cheek succeed, and the bony structure quickly gives way at the yielding point. Thus presenting, the tumour is not hard or unyielding as in schirrus, but soft and doughy, sometimes even fluctuating as if from fluid enclosed beneath. The difficulties attending the early diagnosis of these cases is ably summed up by Mr Lyon.

"The absence," he remarks, "of much pain at the commencement, often prevents the patient from applying until the affection has extended beyond the limits of the antrum; while the disease being rare, the surgeon is not afforded the opportunities for its recognizance, and a correct diagnosis is not formed until too late to be useful. A source of frequent error, causing the disease to be neglected, is the elasticity of hæmatoid disease being confounded with fluctuation—a mistake the more likely, that the fungus often shows itself in the usual site of gum abscess, or it protrudes into the nostril, and is taken for, and treated for, polypus, as in the instance I have detailed. It will be apparent that it is only while the morbid growth is confined to the body of the bone, or to the antrum, that there can be any hope from removal of the maxilla—for the neighbouring parts are so irregular in their surfaces, contain so many foramina, and enclose such important organs, that if the disease extends to them, its thorough eradication is impossible. But the growth may extend in all directions, and yet may be still contained within the walls of the antrum. In these instances the whole bone expands, and becomes attenuated by the pressure from within, as it may frequently be seen partially to do in the more favourable cases, anteriorly inside of the cheek, or inferiorly into the mouth, where the thinner expanded shell may be felt crackling under the finger like parchment."

"Another point of difficulty," continues this excellent practical writer, "is the determination of the malignant or benign nature of maxillary tumours. When I reflect upon the many different kinds of hæmatoid disease, and their various appearances at different stages of their progress, I think positive decision as to their nature impracticable, even though assisted by sight and touch, the aids of which we can rarely obtain without first laying open the antrum. And although we may be thus enabled to decide whether the growth be benign or the contrary, as it is always, we believe, attached to the whole surface of the membrane lining the antrum, or its osseous walls, or springs from the body of the bone, we suspect even mild growths soon destroy the osseous parieties by pressure, and become inextricably connected with the adjacent organs and tissues."

I have pointed out freely the great difficulties in the way of forming a correct diagnosis of malignant disease of the antrum, in order that the pure practitioner in dentistry may be alive to these difficulties, and may not by error in diagnosis, and by ineffective treatment, prevent the patient from soliciting that farther operative skill which belongs to the operating surgeon.

As many of these cases of malignant disease are mistaken for affections of the teeth, the dental practitioner is he who is most likely to be first consulted. The case clear to him as one of tumour in the antrum, it remains for him at once to transfer the case to his brother surgical practitioner; inasmuch as, if operation is to be done, every day lost is a year against the chances of success.

Let me briefly sum up, then, the main diagnostic points in this class of disease.

They are:

1. The appearance of swelling of the cheek, with acute pain.
2. Hæmorrhage from the nose, and indications of fungus growth in the nasal cavity.
3. Extension of swelling to the palate, with crackling sensation on making pressure on the palate bone, or projection of fungous substance in the position of gum abscess.
4. The cancerous cachexia.
5. The age of the patient; the middle age, or a period after the middle age, being the dangerous periods.
6. History of hereditary tendency to malignant growth.

To these general signs two others may be added.

In some instances, as the disease depends on a general producing cause, its local development is not confined to one part. Sometimes there is an accompanying enlargement and painful condition of a lymphatic gland; as, for example, of one of the neck glands. If this be present, the evidence, taken with the preceding signs, is strongly in favour of malignant maxillary disease.

Again, in all cases of doubt, where the evidence negatives the view of malignant disorder, it is always consistent with the soundest rule of practice to remove a tooth from beneath the maxillary cavity, and to puncture the cavity so as to give vent to any contained fluid. If, then, this puncture is made and fluid does not follow; or if, instead of purulent or mucous fluid following, blood flow, the evidence is so far favourable to the hypothesis of cancerous disease, that the case is at least one which comes into the domain of the physician or the surgeon.

Are there any more sources of fallacy in the diagnosis of cancerous growth in the antrum? I think not; at least I think that there are none of serious moment. Two conditions may, nevertheless, be considered. These points are advanced with great force and plainness by Mr Redfern Davies in a history of encephaloid disease of the antrum, recorded in the 'Lancet' for

January 23, 1858, and reprinted in full in the 'Quarterly Journal of Dental Science.' The conditions which might occur, instead, are exostosis of the maxillary bone, and polypus of the nose extending into the antrum.

Now in any case exostosis of the maxillary bone would be known from malignant disease by a few simple and common-sense indications. The swelling in the first is very slow; secondly, it is very firm; thirdly, it is persistently firm; fourthly, it is not the swelling which would naturally follow pressure exerted within the cavity of a bone and extending in all directions, but it is a projection from one special point, extending by simple increase of itself, and after the manner in which it was first laid down.

With regard to polypus commencing in the nasal cavity, there is this general and very satisfactory indication: that polypus commencing in the nose and extending into the antrum may be distinguished as of polypoid growth from the first, by the simple circumstance that the growth did commence in the nose; for it seems to be the law regarding simple polypoid growth, that it never affects the nose from the antrum, but always affects the antrum from the nose; while true fungous growth in the nose, on the contrary, affects the nose from the antrum, and not the antrum from the nose.

In any case, then, of suspected disease of the antrum, examine always the nose. If in the nasal cavity there be any signs of nasal polypus, and the previous signs have been mainly those of nasal polypus, the enlargement and pain about the antrum having succeeded the nasal symptoms, the evidence then is in favour of disease commencing in the nose, *i.e.*, of nasal polypus extending into the antrum. But if all the symptoms have previously been referred to the antrum, and late in the day there is projection of fungous growth into the nose as from the antrum; if such projection rapidly grôw; and if its emergence be attended with hæmorrhage;—the evidence is too clearly in favour of the existence of malignant disease extending from the antrum into the nasal canal.

I have lately had the pleasure of seeing a case in connection with our President, in which polypous growth of the nasal cavity having firm lateral adhesion on the left side, has been for some time accompanied by frequent attacks of toothache, and decided general enlargement of the cheek. The patient has had two teeth extracted for the toothache without relief, because clearly without reason. Were not the patient young, the prognosis would be of difficulty—but as she is twenty-one years of age only; as the general health is good; as there is no evidence of enlargement of lymphatic gland; and as the symptoms appear to have arisen first in the nose, I should diagnose that the case is one of polypus of the nasal cavity, attended either with extension of the polypoid tumour into the antrum, or by closure of the canal leading from the antrum to the nasal chamber, and consequent accumulation of fluid in the maxillary sinus.

I saw, however, last summer, a fatal case of cancerous disease, with my friend Dr Barker, of Bedford, which indicates that in early stages great difficulty attends diagnosis, even when polypus is the first sign. The patient in this instance presented himself to Dr Barker with no other symptom save that of a polypus in the nasal cavity. As the tumour progressed rapidly, the patient was subjected to the opinion of several of our leading London surgeons, who all pronounced that there was not more than simple polypus. The growth was attempted to be removed, but it grew the more quickly as the result of the operation. Extending rapidly on all sides, it flattened the nose till that organ was continuous throughout with the cheek; piercing the palate bone, it projected through the mouth, removing the anterior part of the jaw by so-called absorption; and finding in this course least opposition, it continued to extend till deglutition was rendered impossible, and death closed the scene.

In this case the patient was over sixty years of age. The disease, though commencing as polypoid, was malignant; and in this sense the diagnostic points offered above were modified. True, the fungoid growth might here also have commenced in the antrum; but the evidence on this particular fact is, unfortunately, defective.

Malignant disease affecting the bony structure of either upper or lower maxillæ may occur from two sources; independently, *i.e.*, from the bone itself; or secondarily, *i.e.*, by becoming involved in neighbouring cancerous disease, as by disease commencing in the lip or other part of the mouth, and extending to the maxillary structure. In cases of this latter description the diagnosis is easy as regards bone, since the extension of the malignant change is traceable onwards from day to day. But, in the earlier stages of the independent variety of malignant maxillary disorder, there are no specific symptoms, by which malignant tumour can be diagnosed from tumour of mild, or, as the phrase goes, of benign cast. We must glean our knowledge slowly, and by careful and constant observation as to the history of the case, and the course of the symptoms. At the best, we can often only infer, and at the best we can often act only upon inference.

There are nevertheless certain broad outlines which are in some measure valuable, which may guide us right, and certainly will not guide wrong.

Cancerous diseases affecting the maxillary bone may assume two forms, namely, the schirrous or the medullary. When the first form is present, the disease commences as an independent growth; beginning in the cancellous structure and extending into the structure removing parts before it, and opening at last by ulceration. In the second or medullary type, the disease may rather be considered as a degeneration of the osseous structure; and its progress is rather that of general enlargement of the bone than the extension of a tumour from the centre circumferentially. The former differs, moreover, in being of slower development, in producing pain more lanceolating in character, in being attended hy enlargement of lymphatic glands, and in giving origin to an enlargement of bone accompanied by great hardness of structure.

Taken together as representatives of one diathetic disorder, they are characterised by the following indications, which, according to intensity, mark them off from simple kinds of osseous disease.

They occur as a general rule about or after the middle age.

They are roused into active development by some exciting cause, such as the presence of a carious tooth, or an injury to the jaw.

They are attended with peculiarly sharp pains, which radiate over a wide surface.

They are characterized, if not at their origin at least early in their progress, by the cancerous cachexia.

They bear with them, in the greater number of instances, the history of hereditary predisposition.

They are relieved by none of the ordinary remedial measures, used with success for the resolution of simple growths.

They are accompanied occasionally by other evidences of cancerous disease, such as hardened gland. This condition is most usual, as we have seen, as the attendant of the schirrus type of the disorder.

Their tendency after their active development is towards extension, either by enclosing natural parts in their growth, or by the removal of normal parts by pressure and destruction of nutrition.

As with malignant growth commencing in the antrum, so, in these examples, the application made by the patient is often in the first instance to the dental practitioner. The primary cause of excitement is a carious or necrosed tooth; the pain felt is referred to such tooth, and removal is required. The surgeon-dentist is the one, therefore, who is constituted first judge as to the existence of malignant disorder. He cannot recognize it too readily, nor apprize his patient of his suspicions with too much circumspect promptitude.

Let me add another important note. It happens not uncommonly that the operation of extraction affords sometimes to the intelligent man an indication of the evil that is at work. It is not necessarily, it is not usually a living tooth which acts as the irritant; it is rather a tooth long dead, with its crown removed, and its body buried in the gum. It is, in short, a tooth which would hardly be expected to ache, concerning which such severe complaint is made. The tooth removed, there exudes from the opened cavity a sanious matter, or perhaps blood, and the tooth, or more than one tooth, is removed, but the pain does not subside, and the swelling does not subside. On the contrary, the pain increases, the swelling increases, but the alveolar cavity, left open and never ceasing to throw out sanious fluid, becomes filled with vegetative growth, after which the disease progresses without obscurity.

One of the best marked cases of malignant disease of the lower jaw which I have ever seen commenced in this way, and while the operator for some weeks afterwards, blind to the real nature of the case, was fiddling at the fungous growth with applications of loaf sugar, vitriol, and caustic, the disease was involving the whole osseous framework, and insuring by its advancement the death which succeeded.

I need not go on to describe the extent to which cancerous degeneration will progress when it attacks the bone structure; nor need I describe the result. Suffice it to say, that in displacement of normal structures, in extension of growth, in fatality of result, it follows the same general rules as those given above in regard to cancer of other parts of the body.

Cancer affecting the soft parts of the mouth, such as the lip, the surface of the cheek, or the tongue, assumes in most examples the epithelial variety of the disease. An exception to this may happen with regard to the tongue, the schirrous or hard cancer being occasionally presented in this organ. This exception, however, need not detain us.

The epithelial cancer affecting the parts named commences under the mucous surface in the form of a small induration, or little warty tumour. The age of the patient is important to be noted, for this cancer is rare before forty years. The tumour has commonly a darkish blue appearance, and is hard and painful to the touch. It rarely is developed, even in those predisposed, without the presence of some irritating cause. Thus, in cancer of the lower lip, the common excitant in smokers is the pipe; it is not so much the pressure of the pipe, however, as the heat of the pipe which excites, for it has been observed that the short pipe, or cutty, is that which proves the readiest irritant. Other irritants play the same part. Thus the primary tumour may commence in the mucous lining of the alveolus, covering a portion of necrosed alveolus, or a carious or necrosed tooth; or the tumour may begin in the mucous lining of the cheek, under the irritation of a broken or jagged tooth. I remember a man, apparently in good health, coming to me about two teeth—one a lower bicuspid, the other the last molar—on account of their causing soreness of the cheek by friction. With no suspicion as to the latent evil, I smoothed down the rough edges with the file, and promised speedy relief; but relief did not come, so I had the teeth taken out, and still no relief. Shortly the two points which had been subjected to the irritation became the seats of the two nodular masses from whence dated the progression of fatal epithelial disease. I saw cancer of the tongue, also, once proceed from similar irritation.

When the small nodule, then, has remained for some little time, ulceration commences at the centre of the mass. The edges of the ulcer are nodulated, and the diseases spreading rapidly, give rise to constant ichorous discharge, constant and unmitigated pain, and now and then to hæmorrhage. Deep fissures which bleed readily form across the ulcerated surface, firm structures lying beneath or near the ulceration are involved, and from the pain, the discharge, and the inability on the part of the sufferer to receive nourishment, the ultimatum is reached.

Cases again may happen in which the tumour first formed does not immediately ulcerate, but taking its base over some portion of mucous membrane, beneath which lies a carious portion of bone or tooth, increases largely in size, and becomes a pendulous fleshy tumour, which may remain for months very painful and troublesome, but without ulceration. If the disease is really malignant, time is the only element, nevertheless, to ensure ulceration. The ulceration at last commencing on the surface of the tumefied mass, goes on spreading, the parts beneath become involved, and the symptoms take the same course as in the cases previously discussed.

Turn we now to the principles of treatment in cases of malignant disease affecting the organs of mastication. To the practitioner of dentistry, as occurring in his every-day life, these are few and simple; to the practitioner of surgery they are momentous, and of all others most difficult. Let us glance at both positions.

The practitioner of dentistry meeting with doubtful cases of malignant disease has two points to bear in mind:

First. To use such means as science shall supply to him of ascertaining the nature of the disease.

Secondly. To use such means as come within the scope of his art, to relieve symptoms, or to test by operation the cause of symptoms.

Thus, in disease involving the antrum, if there be no indication of polypoid growth in the nasal canal, and if the evidence is doubtful whether the enlargement or pain are due to cancer growth or to accumulation of fluid, it is as much his duty as that of the surgeon to endeavour, if he sees the opportunity, to settle this point by extraction of a molar, and perforation of the maxillary.

In cases of doubtful disease of the maxillary bone, it is equally his care to remove the sources of irritation arising from teeth.

In cases of epithelial cancer, doubtful in character, the same rule obtains. In all these instances there is one rule of practice common to the duties of both professions, to remove exciting causes, and the member of either profession does that best whose hand is most skilled in the work.

But these simple rules obeyed, the malignant malady proved by the inefficacy of the simpler measures or by the specific symptoms, the rest belongs to the physician or to the surgeon, according as cancer shall be considered a medical or a surgical disease; and now the grand question of treatment turns on one of two points, the general or the local.

The general aims at removing the systemic cause.

The local treatment, however applied, goes to the local eradication of the diseased part.

In the way of local treatment how many plans might not one enumerate. From the seething iron of the old barbarians, to the sulphate of zinc caustic of Dr Fell, you shall find in medical literature every variety of caustic and every shade of resolvent.

In modern days the local war wages between the knife and the caustic. Before the time of Alexander Monro the knife had unlimited sway. Then Monro declaring that out of sixty cases operated on which he observed, only four recovered, and that those operated on died sooner than those who were let alone, blunted the edge of the knife for a long season. In the hands of Sir Everard Home, the prince of prigs, and Sir Astley Cooper, the prince of surgeons, the knife came again into full repute. Lately there has been another change. Some years ago Professor Paget expressed an opinion which endorsed the almost forgotten statement of Monro. Since that time this eminent man has changed, I believe, his views. So opinion fluctuates.

Now, apart from the abstract question of removal and non-removal, this surely is the common-sense view, as between removal by the knife and removal by caustics; that what the caustic can do by removal the knife can do better, cleaner, infinitely quicker, and in the end, banishing even chloroform, with much less pain.

This admitted, the question next turns on the propriety of removal at all. In the confliction of statement it is difficult to answer this question. But this fact seems evident, that if the knife is to be used at all, it is to be used effectively when once taken up, and it is to be taken up as early as diagnosis is complete.

Except I were to trouble you with the details of operations for special cancerous diseases, I could say no more; and this is all I have to say as regards the knife.

But I must not omit to name one novelty in local treatment. My excellent friend Dr James Arnott has of late years suggested the removal of cancerous growths by means of benumbing cold. He would entirely destroy the life of the new growth by the frequent application of freezing mixture; recently he has suggested the additional use of caustics with cold; by which suggestion he hopes that more effectual removal may be obtained without the establishment of any additional pain.

Dr Arnott's plan has not yet been tried with such observation from the history of many cases as would warrant the expression of an opinion as to its ultimate value.

But whatever mode of local treatment be employed, this truth must be told of it, that it is palliative at best, and no more. The disease will return. It need not return in the same part, but it will return somewhere. As well attempt to destroy mankind by destroying all the infants as to attempt to destroy cancer by removing its products.

If we are to expect any cure for cancer, we must seek for it in general measures. We must find its cause or its antidote. What number of antidotes have been raised I could not tell in a single lecture. The whole 'Pharmacopœia' fifty times edited has been tested; and yet no remedy save in that narcotic series, of which opium is the great representative, which palliate without cure. Shall we then hopelessly give up the search? Certainly not. I for one believe, though no worshipper of nostrums and symbolicals, that as cancer is a chemical disorder, so there is for it a chemical remedy. That as quinine, by its chemical influence, cures ague, and arsenic lepra, so shall a like remedy be found some day for malignant disease.

Meanwhile, living in hope, this outline of a provisional treatment for cancer must be given. That the cancer-stricken will find his best remedy, not in hospital ward, nor in crowded city, but on the hills, where flowers grow, the sun shines, and the air gives even that lease of life which physic as yet fails to supply.

MONTHLY MEETING, TUESDAY, JUNE 7th.

PETER MATTHEWS, ESQ., IN THE CHAIR.

REPORT OF COMMITTEE ON ELECTRICITY AS AN ANÆSTHETIC IN DENTAL OPERATIONS.

The last ordinary Meeting of the Session was held on Tuesday, June 7th, when, in addition to a large attendance of Members, there were present, Drs Richardson, Camps, Kidd, Burrows, Lawrence, Mackenzie, Wyld; Messrs Harry Lobb, Marshall, Betts, Forsyth, Hertslet, &c.

Mr **Matthews**, on taking the chair, said, that as this was the last ordinary meeting of the Members of the College for this Session, it had been thought a fitting opportunity for the Report of the Committee on Dental Anæsthesia to be presented. It would be remembered that at the public meeting in October, 1858, when there was a very large assembly of the profession generally—who had been invited to attend and express their opinion upon Electricity as an Anæsthetic applied to Dental Surgery— a Committee had been formed, he was happy to say, a very large Committee, consisting of many eminent men, physicians and surgeons, and a great many dental surgeons. That Committee had been very arduous in their exertions and inquiries, and they were prepared to present their Report that evening.

Dr **Richardson** then read the Report of the Committee, which elicited considerable applause.

REPORT OF COMMITTEE.

It is the business of the committee appointed by the College of Dentists on the 12th of October, 1858, to bring forward in the report now presented the results of the inquiries instituted by the members of the committee, relative to the value of electricity as an anæsthetic in operations on the teeth.

The points of inquiry specially recommended to the notice of the committee seemed to resolve themselves primarily into the following:—

1. In a strict physiological sense can electricity be applied in such a way as to remove from any part of the body its normal sensibility?
2. Can electricity be so applied with promise of success in the operative department of dentistry?
3. Granting that an affirmative is given to the two preceding questions, what apparatus is to be commended as at once the cheapest, the most compact, and the most manageable for the Dental Practitioner?

Historical Note.—Electricity as an assumed anæsthetic was for the first time brought forward prominently in practice by our American brethren, in the course of the year 1858. In commencing its report, the committee must indicate, however, that the question of anæsthetic agency derivable from electricity had been brought forward as a curious scientific problem on many occasions. Thus the application of an electrical current to parts suffering from neuralgiac pain as a means of reducing that pain has been practised for many years, and, according to the observations of various authors, with a considerable measure of success. These observations have been made on the continent and in this country. The subject has likewise been accidentally studied by experiment. As far back as the year 1853, one of ourselves, in performing an experiment on a dog with a Leyden battery, prostrated the animal by a powerful shock, and proceeded, whilst the animal was insensible, to cut down to the external jugular. The vein was disclosed, blood was drawn from it, and sutures were placed in the wound while yet the animal was insensible. After the operation was completed the dog became conscious and recovered. The observation thus made was without intention, and, in so far as the result bore on anæsthesia, was accidental. But the circumstance led the author of the experiment to carry on for some months inquiries as to the reduction of sensation in parts locally by the aid of the electric current and the administration of repeated discharges from the Leyden battery. The end of these experiences was, that the electric current had no anæsthetic virtues when locally applied, and that the electrical discharge could only be considered as effective when so employed as to destroy the consciousness of the animal.

In the way of history the few facts above supplied include all that we can discover towards the attempt of producing anæsthesia by electricity. Until such time as the members of the Dental Profession in America, headed by Dr Francis, recommended and practised the system of employing an intermittent induced current in extraction.

The committee at their earliest sittings met to discuss only the order in which they should proceed in their researches, and to familiarise themselves with the use of the instruments about to be employed. At the fourth meeting resolutions were unanimously carried to the effect :—

That each gentleman who should bring cases for operation should describe the nature of the case and the operation required. That two members of committee should then inspect the case and report their opinions. That in operating with the electrical current as an adjunct, the method of applying the current should be variously modified, the intermittent and the continuous currents being both called into requisition. That at the termination of each series of experiments, the report of the result of each case should be read by the honorary secretary, and confirmed by an unanimous vote. At first, also, it was thought best that the operations to be recorded should be witnessed by the full committee. Ultimately sub-committees were established, and reports from them were received.

LIST OF ELECTRICAL APPARATUS USED.

1. The ordinary one, called the intermittent induced apparatus, commonly known as Smee's electro-magnetic machine.
   This was used with and without the spring foot-board for closing the circuit after the tooth was grasped.
2. The apparatus of MM. Legendre et Morin, for producing the induced intermittent current.
3. A Smee battery of 12 cells for the continuous current.
4. A Pulvermacher chain of from 60 to 120 elements for a continuous current.
5. A Daniel battery for the continuous current.
6. Piggott's electro-magnetic machine for producing the intermittent current.
7. An electro-magnetic machine giving primary and secondary currents, made by Siemens of Berlin.

EXPERIMENTAL OBSERVATIONS.

The committee, before passing to the history of the experiments performed, have to offer one or two prefatory remarks.

The first series of experiments were confined to the intermittent current; the second to the continuous. This arrangement was maintained unbroken, except in one or two instances. The exceptions we made when in the same patient two or more teeth had to be extracted. By changing the character of the experiment on these occasions comparative results were secured and recorded.

In taking their record, the reporters have often intentionally used the actual words applied by the patients as expressive of their sensations in regard to the operation. Elegance of expression has not been invariably secured by this plan, but its adoption has given faithfulness to the narrative, a more important item.

In their own remarks the reporters have frequently used the term, a current of electricity, in speaking of the transmission of the electrical force. In employing this term they have been guided solely by custom ; it is not their intention to convey by the term the common idea of an actual current as of a fluid.

To save the repetition of what would otherwise be a constantly recurring statement, the reporters would observe that in using the intermittent current, the position of the poles of the battery were reversed during each alternate experiment, *i.e.*, if in experiment (A) the positive pole were connected with the tooth and the negative with the hand, in the next experiment the negative pole was connected with the tooth and the positive with the hand, and so on throughout.

Lastly, in all cases the usual care was taken to secure insulation, so that the hand of the operator should not interfere with the circuit.

LIST OF OBSERVATIONS ON OPERATIONS PERFORMED WITH THE INTERMITTENT CURRENT.*

A young woman appeared before the committee, to have three stumps extracted. The stumps were firmly fixed in the jaw. A gentle intermittent current from the electro-magnetic machine was produced, and the force modified until the patient expressed, on taking the poles into her hands, that the sensation produced was easily bearable. One pole was now removed from the hand, and the wire attached to the forceps. The forceps applied to the tooth exerted the same sensation as in the hands. The stump was then extracted.

Result.—The extraction was painful. The patient complained of pain at every step; in the laying hold of the tooth and in the dislocation. The expression of pain at the moment of operating was as marked as in operations where electricity is not used.

OBSERVATION 2.—The second stump was extracted with forceps, a continuous current of electricity from a sixty-link Pulvermacher chain being employed. The pole from the positive end of the chain was in this instance applied beneath the jaw at a point corresponding to the tooth above. The negative pole was attached to the forceps.

Result.—The same as in the extraction of the first stump. Pain equally expressed.

OBSERVATION 3.—The third stump was extracted from the same patient with forceps, the intermittent current being used in the same manner as in Observation 1.

Result.—As in two preceding observations. The patient stated, when all the stumps had been extracted, that the pain in each was equally severe. She could not herself distinguish any difference.

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* Meeting of committee at 5 Cavendish square, on Friday, November the 19th, 1858. Present: Drs Elliotson, Richardson, Lawrence, and Arnott; Messrs Perkins, Matthews, Harry Lobb, Harding, Purland, Weiss, Kempton, E. Williams, and Hockley.

OBSERVATION 4.—A young man presented himself, requesting that a molar tooth should be extracted. A gentle intermittent current was passed through the arm and tooth, the forceps being the immediately connecting body with the tooth. This patient, before and during the operation, was very pale and faint, a fact to which we would draw special attention, as bearing on points to be considered in the sequel.

Result.—He expressed, after the operation and his recovery from the faintness, that he had experienced no great pain, and that the extraction was much less painful than the toothache. It was clear also from the expression during the extraction that the pain felt was not severe.

OBSERVATION 5.—A gentleman was the subject of this observation. The tooth was a stump, firmly fixed. The key was used for extraction. The intermittent current of electricity was applied, the current being directed from the hand to the tooth through the key, to the staff of which the pole from the battery was attached. The current was made much more powerful on this occasion.

Result.—The pain of extraction was very severe ; as marked as in cases of extraction without the current.

OBSERVATION 6.—A young girl, florid and fearless, was the subject of this observation. A molar tooth was required to be extracted. The intermittent current from the hand to the tooth through the forceps was used, and the current was made powerful to the extent of being just bearable.

Result.—The patient described the pain of extraction as most severe, and the expression during operation was such as marked the fact that no mitigation of pain had been secured.

* OBSERVATION 7.—The patient was a girl of healthy aspect. She requested the removal of a lower molar tooth. The induced intermittent current was used, one pole being placed beneath the angle of the jaw, the other to the forceps.

Result.—The extraction was simply described as "not very painful."

OBSERVATION 8.—The patient was a healthy boy. He asked to have removed a molar tooth. The electrical current was applied as in the case immediately preceding.

Result.—The same as in last. The patient described the extraction as "not very painful."

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* OBSERVATIONS 7 to 14.—Made at a meeting of committee held on Friday, December the 3rd, 1858. Present: Drs Elliotson, Richardson, and Lawrence; Messrs Matthews, Harry Lobb, Kempton, Williams, Thomson, and Hockley.

OBSERVATION 9.—The patient was an adult man of pallid appearance. He required three extractions. A canine stump was first operated on. The electrical current was applied exactly as in the case preceding.

Result.—The man expressed having felt pain during the extraction, but not severely.

OBSERVATION 10.—A molar tooth was next extracted from the same person without electricity.

Result.—The pain felt was more severe, according to the patient, than in the extraction of the canine stump with the electrical current.

OBSERVATION 11.—A molar stump was removed from this person. Electricity was again not employed.

Result.—He described the pain as having been much more severe than that produced by the extraction of the canine.

OBSERVATION 12.—The patient was an adult man, of pale cast of countenance. He wished to have a molar tooth extracted. The primary interrupted current of electricity was used, one pole being placed in the hand, the other attached to the forceps.

Result.—The operation was considered by the man to be not very painful.

OBSERVATION 13.—A stump of a bicuspid was extracted for the same patient without the use of electricity.

Result.—The pain was described as infinitely more severe than in the preceding operation.

OBSERVATION 14.—The patient was a healthy man. The tooth to be extracted was a molar. The primary interrupted current was used in precisely the same manner as in Observation 13.

Result.—The evidence of severe pain was most striking; the patient afterwards described it as "awful." Some of the committee inferred that the pain was increased by the electricity.

* OBSERVATION 15.—The patient was a girl. She requested the removal of an upper molar. The induced intermittent current from Smee's electro-magnetic machine was used, the connection being made between the hand and tooth.

Result.—In extracting, the tooth unfortunately broke. The attempt to extract the remaining portion was not allowed. The girl gave vent to expression of great pain.

OBSERVATION 16.—The patient was a girl; the tooth to be extracted a first lower molar. The same electrical apparatus was employed as in the last case, and in the same manner.

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* OBSERVATIONS 15 to 18.—Made at a meeting of the committee held on Friday, December the 10th, 1858. Present: Drs Elliotson, Richardson, and Lawrence; Messrs Matthews, Harry Lobb, Purland, Weiss, Kempton, Thomson, Perkins, Williams, and Hockley.

Result.—The expression of pain during extraction was subdued; and the girl herself explained that she had experienced a " funny " sensation rather than pain, and that such sensation had been felt in the arm more than in the tooth. As in the case described in Observation 4, this patient was in a partial syncope before and during the operation.

Observation 17.—The patient was a young man ; the tooth to be extracted a lower molar. The same apparatus was employed as in the last case, and in the same manner.

Result.—The pain of extraction was slight; the pain produced by the electric current being most felt. The sensation excited was distributed over the tooth, neck, and arm.

Observation 18.—The patient was a man, the same person noted as operated on in Observation 14. The second upper molar was the tooth to be extracted. The induced intermittent current was applied, by means of Legendre and Morin's apparatus, the circuit being from the hand to the tooth in the usual way.

Result.—The pain of extraction was comparatively slight, and was described as being less than that caused by the electric shock. The sensation produced by the current was distributed over the tooth, the neck, and the arm.

* Observation 19.—The patient was a youth, aged fourteen years. The first molar of the upper jaw was the tooth to be extracted ; it was carious in its centre, and had given rise to much aching pain. The primary interrupted current was used, the circuit being made between the tooth and jaw. The force of the current was very moderate, sufficient to be little more than pleasant.

Result.—Extraction was described as not having been very painful, but not less painful than in a previous case where it had been performed without electricity. The extraction on the present occasion gave more pain than the electricity.

Observation 20. — The patient was an adult man. The tooth to be extracted was a first lower molar. The primary interrupted current was again used, the circuit being made between the hand and tooth. The current was made very powerful, so as to be just tolerable.

Result.—The man, who was one of the most intelligent of those operated on by the committee, gave very definite information as to the results. He had had five teeth extracted before, without electricity. He said that the electricity was very painful, but that the pain of extraction was less with it than without it. In future he should prefer to have such operation similarly performed.

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* Observations 19 to 22.—Made at a meeting of committee held on Friday, December the 17th, 1858. Present: Drs Elliotson, Richardson, Arnott, and Lawrence; Messrs Matthews, Harry Lobb, Purland, Perkins, Williams, Thomson, Kempton, and Hockley.

Observation 21.—The patient was a youth of fifteen years; the tooth to be extracted was the first lower molar, which was much decayed in the centre. The primary interrupted current was applied as in the last case, and with the same force.

Result.—The pain of the electricity felt so markedly by the previous patient was scarcely felt by the present one. In this case, however, the pain arising from extraction was very severe.

Observation 22.—The patient was an adult man. The tooth to be extracted was the first upper molar. The tooth was decayed laterally. The primary interrupted current was applied in the same manner as before, but with much more force.

Result.—The man had had teeth extracted before. The electricity was described by him as being very severe to bear, and as being more painful, indeed, than the extraction. The extraction itself was, he believed, less painful than it had been in other cases where no electricity was used.

* Observation 23.—The patient was an adult man. The tooth to be extracted a first lower molar on the right side. The secondary interrupted current was used, the circuit being established between the hand and the tooth. The key was used as the extracting instrument, one pole from the battery being attached to the staff of the key. A gentle current was used. The operation was instantaneous.

Result.—The patient was conscious rather of a sudden shock than of pain. It was impossible to say how far the current modified the pain.

Observation 24.—The patient was, again, an adult man. The tooth to be extracted the first lower molar on the right side. The secondary interrupted current was used exactly as in the case last preceding. The key was this time used also as the extracting instrument. The tooth was removed by one rapid movement.

Result.—The pain felt was little, and was much less than in cases of extraction to which the patient had before been subjected without electricity. There were, however, other circumstances which might have modified the pain. The tooth was loose, it was but little covered with gum, and the extraction was more than usually rapid.

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* Observations 23 to 25.—Made at a meeting of the committee held on Friday, December 31st, 1858.—Present: Drs Elliotson and Richardson; Messrs Matthews, Harry Lobb, Perkins, Weiss, Purland, and Hockley.

OBSERVATION 25.—The patient recorded as operated on in Observation 23 wished, after he had rested, to have a second upper molar tooth extracted. The current was applied exactly as before, but the forceps were used in extraction instead of the key. The operation was much longer in performance than in the previous extraction.

Result. — The expression of pain during the operation was peculiarly acute, and the patient afterwards stated that the suffering was excessive. Still he thought that it was possibly less than in the instances when extraction had been made without the application of the current.

The committee having thus conducted, with all the care and attention at command, twenty-five operations of extraction, in twenty-one of which the intermittent current had been used ; in one the continuous, and in three no current, submitted their labours to a sub-committee for analysis, consisting of Dr Lawrence, Mr Matthews, Mr Lobb, and Mr Perkins. On Friday, February 28th, the sub-committee presented an account of the cases, and suggested that the continuous current should be used in further observations. The committee agreed to this course.

EXPERIMENTAL INQUIRIES WITH THE CONTINUOUS CURRENT OF ELECTRICITY.

In the use of the continuous current certain modifications are required in the way of application. In applying the intermittent the object is simply to excite shock at the moment of extraction, for a carefully conducted experiment shows clearly that a prolonged application of the intermittent shock has no more influence in deadening sensibility, under ordinary circumstances, than a brief application.

In using the continuous current the production of shock is not the intention. The shock felt is momentary, *i.e.*, is appreciable only at the closing and opening of the circuit. To institute by the continuous circuit a series of shocks by the act of frequently making contact would have been virtually but to repeat the experiments with the intermittent current. The committee were obliged to spend more time over each of their observations ; the inquiry being, not whether shock would produce anæsthesia, but whether an uninterrupted current of electricity, passed through a tooth for a given and practicable time, would lead to that result.

The time usually employed by the committee for the continuance of the current was not over fifteen minutes. It was felt that an agency which would not produce its effect, in the general run of cases, within this period, would not, unless it should possess some advantages pre-eminently great, be commendable as of instant and practical service to the operator. The mode of proceeding will be best described in the narratives of observations.

* OBSERVATION 26. — The patient who first presented herself was an adult woman. She desired the extraction of an upper anterior molar tooth. A Daniel battery of forty cells was in play. The positive pole was attached to a conducting handle armed at its extremity with moistened sponge. The sponge was placed above the angle of the jaw, a little in front of the ear, and was there secured. The cavity of the tooth was filled with moist cotton wool, and the exposed tip of the negative pole (all the rest of the wire being insulated with gutta percha) was gently inserted into the cotton wool. The pain produced on making contact was excessive, and could not be borne many minutes. The positive pole was therefore removed from the face until the battery could be reduced to twenty cells. The sponge reapplied, the current was kept up for five minutes, but the pain was great, and faintness threatened. The tooth was consequently liberated from the wire and extracted with forceps, no electrical force being used during extraction.

Result.—The patient showed evident signs of acute pain, and expressed afterwards that the pain of operation was as severe as on a preceding occasion, when a tooth was removed for her without electricity.

OBSERVATION 27.—The patient was an adult man. He requested to have removed a lower molar tooth. The tooth was loose. The Daniel battery as before, but reduced to fifteen cells, was used. The sponge was this time changed to the negative pole, and the negative pole was applied externally over the jaw, at a point corresponding to the tooth, the end positive pole, being placed in the cavity of the tooth, surrounded by a bit of moist cotton wool as before. On closing the circuit the pain excited was severe, and it returned at short intervals so acutely, that after the application had continued for three minutes the patient got irritable, and would have no more of it. The connection was therefore broken, and the tooth was extracted.

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* OBSERVATIONS 26 to 28. — Made on Friday, February the 18th, 1859. Present: Drs Elliotson, Richardson, and Lawrence; Messrs Matthews, Harry Lobb, Purland, Perkins, Thomson, Kempton, Hockley, Weiss, and Williams.

Result.—The extraction was attended with the ordinary amount of pain.

OBSERVATION 28.—The patient was an adult man. He presented himself to have a first lower molar extracted. The Daniel battery was again used, reduced to ten cells. The positive pole was again applied to the tooth cavity, the negative with moistened sponge behind the angle of the jaw externally. On closing the circuit there, a smart shock and the transition of the current gave pain. At the end of the third minute, syncope being imminent, the poles were removed and the tooth was extracted with the forceps.

Result.—The extraction was attended with the usual demonstration of acute pain.

*OBSERVATION 29.—The patient was a woman. The tooth to be extracted a lower molar. A Pulvermacher chain of 120 links was used on this occasion. The positive pole was placed externally, attached to conductor with moist sponge, behind the ramas of the jaw. The end of the negative pole was attached to the forceps, which were then made gently to grasp the tooth. The current was kept up for fifteen minutes. During the time of the application the woman became drowsy and lapsed into a kind of hysterical faint. At the end of the fifteen minutes the tooth was extracted.

Result. — The woman on recovery expressed herself as unconscious of all that had occurred, and was unaware of any painful impression.

OBSERVATION 30.—The patient was a youth. The tooth was an upper molar. The Pulvermacher chain was used as before, but sixty more links were added. The poles were placed with negative side to the tooth positive externally, in same manner as in last case. The current was sustained again for fifteen minutes. The tooth was extracted.

Result.—The extraction of the tooth was attended with comparatively little suffering, less than had resulted from previously lancing the gum or grip of forceps.

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* OBSERVATIONS 29 and 30.—Made on Friday, February the 25th, 1859. Present: Drs Elliotson and Lawrence; Messrs Harry Lobb, Matthews, Purland, Kempton, Weiss, Harding, Perkins, Thomson, Williams, and Hockley.

* OBSERVATION 31.—The patient was an adult man. He presented himself, requesting the extraction of a lower molar tooth. The continuous current, generated from a Pulvermacher chain of 120 elements, was again used. The negative pole was placed to the tooth, the positive externally. The current was kept up for fifteen minutes. Extraction was then made. The case was a severe one.

Result.—The patient expressed that the pain was not less than in a previous instance, when he had been subjected to a similar operation.

OBSERVATION 32. — The patient was a woman. She requested removal of a molar tooth. The continuous current from the Pulvermacher battery of 120 links was again applied, the position of the poles and the time of application being precisely the same as in last experiment.

Result.—The operation was attended with much pain. In so far as removal of pain was concerned the attempt was unsuccessful.

REPORTS OF THE SUB-COMMITTEES.

From the particulars of the labours of the committee in full, your reporters would now pass to the reports of the subcommittees. The sub-committees are numbered (A), (B), (C).

REPORT OF SUB-COMMITTEE A.

This committee consisted of six members, viz.: Messrs Matthews, Harry Lobb, W. Perkins, H. Kempton, E. Williams, and A. Hockley.

The committee have handed in the following history of their proceedings:

" The sub-committee beg to report that its members have met on repeated occasions at the Westminster General Dispensary, and have performed not less than thirty-one operations of extraction of teeth, the electrical current being used with the intention of reducing the pain.

" In thirty of these operations the induced intermittent current was used, in the way usually recommended, *i. e.*, one pole was placed in the hand of the patient; the other attached to the forceps, the hand of the operator being insulated. The current was also used with varying degrees of force; from a force that was simply pleasant to one that was painfully severe. In one single case the continuous current was used from a Pulvermacher chain of sixty elements.

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* **OBSERVATIONS 31 and 32.—Made at a meeting of committee held on March the 4th, 1859. Present: Dr Lawrence; Messrs Matthews, Harry Lobb, Purland, Weiss, Kempton, Williams, Perkins, and Hockley.**

"As the results obtained were too uniform to require any detailed history, the sub-committee are content to sum up all they observed in two statements.

"1. That in no instance, under the influence of the electrical current, was there any approach towards the production of local anæsthesia.

"2. That in many instances the pain of extraction did seem to be modified or rather changed in character by the currrent; in some instances this change in the character of the sensations developed, seemed, moreover, to be satisfactory to the patients, as in some measure breaking the acute shock of the operation."

REPORT OF SUB-COMMITTEE B.

This committee, consisting of Messrs Perkins, Williams, and Kempton, state:

"We have had one meeting on Friday, January the 14th, 1859. There were two cases for operation. We used the intermittent current, placing one pole in the hand of the patient and attaching the other pole to the forceps.

"The first case was that of a man aged twenty-three years. The tooth to be extracted was an upper molar. After extraction the patient expressed that the sensation produced by the galvanism was much greater than that produced by the extraction. As compared with previous instances in which the same operation had been performed, the present operation was more bearable.

"In the second case a youth of thirteen was the patient. He desired us to remove a first lower molar. This patient expressed that he did not feel much pain, less, he thought, than on a previous occasion when he had had a tooth withdrawn without the aid of the electrical current.

"The sub-committee have no comments to make on these cases, but the cases may be useful as adding to the list of cases already subjected to operation."

REPORT OF SUB-COMMITTEE C.

This sub-committee consisted of Mr Harry Lobb and Mr Kempton. These gentlemen give the history of two cases in which extraction was performed, after the application of the continuous current. They state:

"The patients operated upon by us were both females. We employed in each case a Pulvermacher battery of 120 elements. We placed the end of the positive conductor connected with a moistened sponge (externally) over the jaw; the point of the negative conductor was attached to the forceps, which were made to grasp the tooth. The current was sustained in each instance for fifteen minutes.

"In neither case was there any evidence of the production of anæsthesia. In one case the pain of extraction was modified; in the other the pain was as severe as it might be expected to be without the current."

SUMMARY.

The committee have thus in their possession the records of sixty-eight cases of tooth extraction, in sixty-five of which the anæsthetic value of electricity was tested, with all the care and the knowledge at the command of the observers. Fifty-five of these operations were performed to test the value of the intermittent current. Ten were performed to test the value of the continuous current. In these experiments every possible modification was introduced. The poles of the batteries were reversed in different cases; the force of the current as indicated by the sensations of the patients was varied; and every necessary precaution was taken to secure insulation of the operator.

The committee, in viewing the whole of the results of the experiments thus performed, find that in much the larger proportion of cases the results were purely negative. In several instances more pain was excited, owing to the application of the current, than if the tooth had been removed at once by simple extraction, in other instances less, while in a few cases, amounting to five altogether, there was evidence of relief. In three instances this evidence was well marked.

The committee does not, however, put forward these latter five named cases as instances of local anæsthesia. It appears to the committee that in all instances where success was apparent, a mental element was called into action, and that the patients at the time of the operation were in a state of partial general insensibility, due probably to hysterical syncope.

In those examples where the patients expressed that the pain was less than they had experienced on previous occasions, the assumed relief did not arise from the fact that the tooth and its neighbouring parts had been rendered dead to external impressions, but from various extraneous causes, of which the committee may enumerate, as most prominent,

1. Diversion of sensation.
2. Less difficulty in extraction as compared with previous extractions.
3. Syncope more or less marked.
4. Differences in the method of operating.

In those examples where the pain seemed to be increased by the electricity, the cause of the increased pain was obvious. The cases were those in which the tooth was exceedingly sensitive, either from recent inflammation of the pulp, from abscess, or from inflammation of the alveolar periosteum. In many of these cases the patient could only bear the gentlest current, and that with much complaint as to the unnecessary addition of pain.

The committee, as will be observed from the history of the observations, made various changes in the mode of applying the electrical current. These changes had reference to the direction of the current, the poles being generally reversed in each experiment, to the force of the current as defined by the sensations of the patient and to the position of the poles in regard to different parts of the body.

The conclusions at which the committee could only arrive as the summary of their combined observations, are—

(*a*) That the direction of the current does not in any way modify the result.

(*b*) That the force of the current has, equally, but little to do with the issue.

(*c*) That the method of placing the poles, in regard to different parts of the body, did not appear to exercise any peculiar difference. The effect was mainly the same, *i.e.*, when one pole being applied to the tooth, the opposite was applied to the hand, the cheek, the neck, or other region.

As regards the different forms of electrical apparatus and current, the committee are forced to the decision, led solely by their own present inquiries, that the differences in effect are not striking. In nearly the same number of cases, relatively, the intermittent and the continuous currents gave an amount of apparent relief, while in the application of both considerable pain was excited in some particular cases.

The committee feels also, that were it even proven that the electrical current could be so applied as to produce anæsthesia of the soft parts and organs, great difficulties would be in the way in making it useful in dental practice; for the tooth structure being a bad conducting medium, the transmission of the current through it, so as to influence the supplying sensitive nerve, would, in the majority of cases, be impossible.

On a final point the committee is unanimous: that in not one instance did any member observe the merest approach to local anæsthesia. Neither in the tooth, nor in the surrounding structures, nor in the part of the body to which the opposite pole was applied, did any indication of insensibility present itself.

The sum and substance of the labours of the committee, in their practical bearing, is this: that the continuous current of electricity is inapplicable as a local anæsthetic in dental operations; that the intermittent current, from being harmless, its use is allowable in practice, by those who may consider it of advantage to produce a diversion of sensation in the patient during extraction; but that as, in a scientific point of view, the electrical force, according to the present knowledge of its application, cannot be accepted as an anæsthetic, the committee could not undertake to recommend any special electrical apparatus, nor any particular method of applying electricity in the operations of dentistry.

The foregoing report, having been read, and discussed in detail by the committee, conveys the unanimous opinion of the members.

John Elliottson	William Perkins
Thos. H. Harding	T. Purland
A. Hockley	B. W. Richardson
H. T. Kempton	Samuel L. Rymer
R. M. Lawrence	Robert Thomson
Harry Wm. Lobb	Felix Weiss
Peter Matthews	Edwin Williams.

APPENDIX.

ON VOLTAIC NARCOTISM IN OPERATIONS ON THE TEETH.

At the time when the Committee were on the point of concluding their preceding observations, the fact was brought forward that by the application of the continuous electrical current in combination with certain narcotic substances, local anæsthesia could be produced to such extent as to enable the surgeon to perform several operations without pain. To the process thus invented the name "Voltaic Narcotism" has been applied by its author.

The committee, anxious to ascertain whether the new process could be applied advantageously in dentistry, discussed at a meeting held on February the 5th, the propriety of investigating that point.

It was then moved that experiments should be instituted and added as an appendix to the report.

The resolution was unanimously adopted, and the following observations are the result:—

Observation 1.—The patient was a youth, aged fourteen.

The tooth to be extracted was a lower molar. Into the cavity of the tooth was placed a small plug of lint saturated with a solution containing two minims of tincture of aconite and ten of chloroform. To the positive pole of a Smee battery of twelve cells a pointed conductor was attached, the handle of which was insulated. The point of this conductor was now inserted into the lint which had been placed in the cavity of the tooth. The negative pole was attached to a conductor, with insulated handle, armed at its opposite end with a sponge moistened with five minims of aconite and fifteen of chloroform. The sponge was applied externally to the jaw, and the circuit was thus completed. The current was sustained for fifteen minutes. The making of the circuit was painful, and there was excited in the tooth a burning sensation with occasional sensation of shock through the parts enclosed between the poles. These effects ceased after twelve minutes. On the poles being removed the tooth was extracted.

Result.—The patient gave expression to sharp pain at the commencement of the operation, but not afterwards. When the extraction was over, he explained that the grip of the forceps on the tooth was very painful, but that the extraction was but slightly felt.

* OBSERVATION 2.—The patient was a girl, aged fourteen. The tooth to be extracted was a lower left molar. The cavity of the tooth having been cleaned, was filled with a plug of lint saturated with three minims of tincture of aconite and five of chloroform. The Smee battery of twelve cells was used. The point of the negative pole was applied to the cotton in the tooth ; the point of the positive pole, surrounded by a layer of wet lint, was applied over the gum in front of the tooth. No evidence of shock was given in closing the circuit. The current was kept up for fifteen minutes and a half, a drop of chloroform being frequently conveyed to the lint in the tooth, at the end of the time named the poles were removed and the tooth was extracted.

Result.—The patient, though quite sensible, gave no expression of pain. After the operation she stated that although quite aware of all that was done, she was conscious of no pain whatever. All she felt was "the rising of the tooth from the socket."

* OBSERVATION 3. — The patient was a woman. The tooth to be extracted was a lower molar. The cavity of the tooth was filled with a small plug of lint containing three

minims of tincture of aconite and five of chloroform. The Smee battery of eight cells was again used, the negative pole being applied to the tooth, the positive to the under surface of the jaw, externally. The tooth was very sensitive, and the pain caused by the current was too painful to be borne. The wires were therefore removed and extraction performed.

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* Observation made on Friday, April the 1st, 1859. Present: Dr Richardson ; Messrs Harding, Purland, Williams, Thomson, Kempton, and Hockley.

Result.—The ordinary amount of pain was produced; the application not having been continued sufficiently long to cause any diminution of sensibility.

After this operation it was arranged that further observations on this subject should be entrusted to sub-committees.

REPORTS OF SUB-COMMITTEES.

ON VOLTAIC NARCOTISM.

Report of a sub-committee, consisting of Dr Richardson, Mr Hockley, and Mr Kempton.

"The sub-committee met on Monday, April the 4th. One patient, a man twenty-four years old, presented himself to have the second right upper molar tooth extracted. An attempt had previously been made on the Friday preceding to remove the tooth, and the crown had been broken off. Since then the tooth and its surrounding structures had been excessively sensitive, so that the parts could scarcely be touched. Four minims of tincture of aconite and ten of chloroform on lint were tried to be inserted into the tooth, but could not be got into any cavity, the broken surface being smooth and flat. The pledget was then laid over the surface simply, and the point of the negative pole from the twelve cell Smee battery was pressed into it. The positive pole of the battery tipped with lint, saturated with eighteen minims of Battley's solution of opium, was applied to the gum interiorly to the tooth. The circuit being thus closed the contact was sustained for seven minutes and a half. The positive pole was changed to the surface of the gum, anteriorly to the tooth. Contact was again sustained for seven minutes and a half, and the poles being removed, extraction was performed. The operation was unusually severe, three attempts having to be made before removal, with considerable force.

"*Result.*—The signs of pain expressed were very severe.

"The sub-committee observes that in this case no alleviation of suffering was obtained in the dislocation, and on examination it was found that the narcotic solution had not entered the tooth at all. The external parts which had before been so sensitive were rendered quite insensible."

Report of a sub-committee consisting of Dr Richardson and

Mr Kempton. The sub-committee state "that four operations have been performed.

"The first patient was a man; the tooth to be extracted was the upper wisdom tooth of the left side. Into the cavity of the tooth a pledget of lint was introduced, moistened with three minims of tincture of aconite and ten of chloroform. The extreme point of the negative pole of a Pulvermacher battery of 200 elements was bound in the wool ; the conductor of the positive pole tipped with moistened sponge was applied behind the ramus of the jaw, externally. The current was sustained ten minutes, when the poles were removed and extraction made.

"*Result.*—There was no indication of pain, and after the extraction the patient affirmed that he had felt nothing whatever. He heard a noise on the dislocation being made, but was conscious of no hurt. He complained that at first the passage of the current gave pain, but this passed away, and a feeling of complete numbness supervened.

"The second case was in a female; the tooth to be removed the second lower molar. There was a deep central cavity in the tooth. The cavity was plugged with lint, saturated with five minims of tincture of aconite and ten of chloroform. The Pulvermacher battery was used exactly as in the preceding case. The current was sustained for seven minutes, then the negative pole was removed from the tooth, and a fresh piece of lint, with the same amount of solution, was inserted. The pole re-applied, the current was kept up for five minutes longer. After this the poles were removed, and extraction performed.

"*Result.*—There was a slight start at the moment of dislocation; but the patient afterwards stated that she felt a shake, not pain. As in the preceding case, there was during the latter part of the application of the anæsthetic a complete numbness of the tooth, which extended along the jaw and into the cheek.

"The third case was in a female ; the tooth to be extracted the upper wisdom tooth of the left side. It was but little decayed, but was inflamed and intensely sensitive. The application of the narcotic solution and electrical current were made as in the two preceding instances, but the lint had to be applied over a slightly broken surface of the tooth. Three applications were made, each time for nine minutes. At the end of this period the external parts being insensible, and the tooth feeling to the patient very benumbed, the extraction was made.

" *Result.*—Some pain was felt, but it was slight and indefinable.

" The fourth case was in a female; the tooth to be extracted a lower molar, with a large shallow cavity in the centre. The cavity was filled with a pledget of lint, saturated with the narcotic solution as before, one minim of creosote being added. The same battery was used, and the poles were applied as in previous cases. At the end of ten minutes, the external parts being insensible, and the tooth feeling benumbed, the poles were removed and extraction was attempted; the tooth unfortunately broke in the middle of the fangs.

" *Result.*—The pain of operation was very severe. The patient also complained of the pain produced in the first instance by the passage of the current.

" The sub-committee in presenting this report would prefer to leave the inferences to be drawn from it with the full committee."

SUMMARY ON VOLTAIC NARCOTISM.

The conclusions arrived at by the committee in relation to the eight observations described above are—

1. That the application of a narcotic solution to a tooth, in connection with a continuous current of electricity of considerable intensity, leads unquestionably to the production of local anæsthesia, so that in some instances the pain of extraction is entirely broken by it.
2. The anæsthesia thus produced is true anæsthesia, extending from the tooth to surrounding parts.
3. The process is limited in its application. As at present understood, it can be only used successfully in cases where the cavity of the tooth is exposed.
4. The time required in the application of the process in each case is a serious obstacle to its practical usefulness.
5. The pain produced in the first stages of the process, particularly when the tooth is irritable, is always complained of. The pain dies away, certainly, as the process goes on, but to be successful, there should be no pain at all during any stage.

6. The above objections are too decided in character to enable the committee to recommend this process as a practice. The members are, nevertheless, of opinion that improvements of an important kind admit of being made in the process; and with the hope that the history thus put forward may serve as the basis of such improvements, they lay the results of their united labours before the profession.

The CHAIRMAN, in rising to move "That the Report be received," thought it right that he should make one or two observations before putting the resolution. At the October meeting the Council of the College of Dentists having been requested to appoint a Committee to investigate the subject of Anæsthesia in dental operations, and the effect of Electricity as an Anæsthetic, the Council immediately met; and they considered that in order to carry out all their observations fully they should invite the assistance of eminent members of the profession who had studied electricity in all its bearings. They accordingly invited Dr Richardson, who had used it greatly; Dr Lawrence; Mr Harry Lobb, and several others. Those gentlemen had been of very great assistance to the committee, and at every meeting had been punctual in their attendance. [Applause.] The committee had drawn up their report honourably and faithfully, and it was now in the hands of the profession to test. So particular had the committee been that they would not take the report of a single individual; no report was given of an isolated case, and all the operations had been carried on collectively. [Hear, hear.]

The motion for the reception of the Report was then carried.

The CHAIRMAN now said,—The Report having been received, he would invite a discussion upon it by the members present, and be happy to answer any questions that might be thought desirable to put upon it. He would beg to state one fact in addition to what he had before observed:—viz., that the committee had not confined themselves to any particular instruments, but had employed all the electrical apparatus which they could get, whether one patent or another; they had not chosen any one particular or intermediate current, but all the machines that they could command had been tried in every case, and they had all amounted to the very same thing. There could be but one opinion as to the continuous current, and nothing could be better than Smee's Battery upon that application.

Dr KIDD said that the medical profession were particularly indebted to the committee for their labours, and if they had not "commanded success," they had at all events "deserved it." [Hear, hear.] He thought it would be a pity that it should go abroad that the absorption of chloroform acted locally. He was satisfied that after 9 minims had gone into the lungs it acted in the ordinary way. He had known several instances in which 10 and 15 drops clearly produced Anæsthesia. He was satisfied that Dr Richardson's application was a valuable one, particularly about the lips, and that it operated in the way of producing an immense deal of good. He did not think it should go abroad amongst the dental profession that a combination of aconite and chloroform applied to a tooth, and then the electrical battery applied, produced Anæsthesia: it was the chloroform that was absorbed into the lungs which produced it. Dr Richardson's combination, he thought, was the whole gist of the Report. In cases of irritations arising from carious teeth a very small amount of chloroform and aconite would produce Anæsthesia. All the complex batteries that were used were evidently absurd and useless. The Committee deserved great credit for having gone through the matter so steadily and carefully, and the medical profession were, he repeated, much indebted to the College of Dentists for such a valuable Report as that which they had presented.

Dr Richardson remarked that in the cases alluded to he was particular in observing whether there was any general anæsthesia from the effect of the application of chloroform and aconite: but there never was in any degree: the Anæsthesia was entirely confined to the teeth and the gums. Even the gum on the opposite side was sensitive; the fingers and hands were perfectly sensitive; and the Anæsthesia in each case of the application was entirely local.

Dr Kidd observed that the fifth and seventh nerves were of immense sensitiveness, and required a great deal of chloroform. He still thought this, that the patient's mind was so much fixed in the tooth-drawing, it being a sort of new thing, that there was a mental process joined to the local effect of chloroform, that between the two and a very small dose of chloroform, there was what might be called local anæsthesia. He would carefully examine the lower limbs, which were first to come under the effect of chloroform.

Dr Camps said he did not pretend to have had much experience in the administration of chloroform, but it was his opinion that its application did produce local anæsthesia, and that Dr Kidd was not justified in affirming that local anæsthesia was not produced by the local application of chloroform. He did not present himself as claiming any large experience, but he still thought that he ought not to resist the evidence submitted by the report which had been read that evening —that chloroform locally applied did produce local anæsthesia, quite apart from its inhalation by the lungs. Though he was not one of the members of the College, yet, as a member of the medical profession, he had much pleasure in moving,—That the thanks of the meeting be accorded to the various committees for their labours on this most important subject; because, though they had not arrived at the success they had anticipated, yet, as Dr Kidd had said, they had deserved it, and it was a merit almost as much to deserve success as to obtain it. [Cheers.] Before sitting down perhaps he might be permitted to say that, in his judgment, the successful application of electricity should be looked for rather in its relief to disordered motion than to disordered sensation; and that would remove it almost out of the pale of application with regard to dental surgery. But he was very much inclined to the opinion that the medical profession had an immense deal to learn with regard to electricity and galvanism (using those terms in their general sense) in their application to impaired or perverted motion, rather than in cases of impaired or perverted sensation. Therefore he was not surprised that the committee had arrived at results in a great degree negative—that was to say, that whether the intermittent or continuous currents of electricity were employed, still the production of anæsthesia was not so certain as they had hoped.

Dr Kidd had very great pleasure in seconding the motion. He was sorry that an impression appeared to have been produced that he had found fault with the report; he had said the report was a most valuable one. [Hear, hear.]

Dr Camps had not said that Dr Kidd found any fault with the report, but he merely stated that he thought Dr Kidd was not justified in affirming that local anæsthesia was not produced by the local application of chloroform.

The Chairman said that the only difference of opinion was as to the production of anæsthesia, whether local or general.

Mr Betts stated that from his own experience of electricity, he was fully satisfied with the results arrived at by the committee; their labours had been extremely arduous, and the report was highly to be approved of for its honesty, and the straightforward manner in which the whole of the experiments seemed to have been carried out by the committee. [Hear.]

Mr Purland said that as a member of the committee he had signed the report, and that he perfectly agreed with its contents. But when he contrasted the experiments detailed in the report with his own actual practice he was bound to say that he reversed that judgment *in toto,* for instead of having at the rate of five successes to sixty failures, he had found that he did not have one in ten as a failure. He did not consider that there was any anæsthesia in the matter, but he did believe that electricity alleviated the pain in a most remarkable degree; to a certain extent it removed the impression of pain and altered the condition of the patient altogether: there was something on the mind, and when that was diverted pain was insensibly manifested. He had extracted a great many teeth, as many as ten from one patient at a sitting, and it had been repeatedly declared to him that there was not the slightest pain. Although in some instances the convulsive motions of the patients had shown every indication of the most agonizing pain, yet when awakened out of the trance they had declared that they did not know that the tooth was extracted: therefore it was not quite true that the patients felt pain because their features expressed it. [Hear, hear.]

Dr Kidd wished to say one word as to whether small doses of chloroform produced anæsthesia:—there was a law of providence with regard to chloroform; were there was excessive pain a very small amount of chloroform sufficed; and where there was the slightest pain more chloroform was required. If it was very defined pain a very small quantity of chloroform would do. That was the result of the experience of Dr Simpson and Dr Snow. The point was an interesting one, as bearing on the use of aconite and chloroform in these cases.

Dr Richardson said that Dr Purland and the College were not at issue in any respect; in fact there was no local anæsthesia from the intermittent current, but a diversion of sensation. With regard to the application of aconite and chloroform, it had a direct local effect wherever applied, but that was governed by the mode in which it was applied, and by the rapidity with which it was absorbed. The only use of electricity was that it produced a readier absorption, by the quickening of the capillary circulation.

Mr Harry Lobb said that the Microscopic Society were aware of that result of the increase of the circulation by the application of the continuous current; and it was known that when the circulation was increased, absorption went on more quickly. Under the microscope this fact could be demonstrated upon a frog, but the intermittent current had precisely the opposite effect; it had the power of contracting the minute arteries and arresting the circulation, that was the difference between the two—the intermittent current arrested the circulation, and the continuous current increased both the capillary and the arterial circulation.

The motion was then carried.

Mr Perkins returned thanks on behalf of the committee.

The Chairman also, in rising to express his thanks, assured the members that the committee had been most anxious to do everything they could that might tend to the elucidation of facts. The council of the College had but one opinion, and their desire was to labour hand and heart to develope and exemplify whatever was laid before them. He would also state that the College was increasing in numbers, and indeed going on exceedingly well: the present season, now terminating, was a good augury of the forthcoming session. [Cheers.] There were four conversazione arranged, and an eminent lecturer was appointed to deliver a course of lectures similar to those of Dr Richardson. The school which had been formed would be in good working operation in October next, as its arrangements were well organised. He would also further observe that it was the intention of the College to grant dental certificates, and that examiners had been appointed among whom were some very eminent men, and he trusted that dental surgery would not be as it had been for a lengthened time, but that each and every one who felt an interest in the profession at large would unite, and let all petty differences cease, with one hand and one heart determined to go on. [Cheers.] He hoped that the end of this year would prove that there was but one wish amongst them, to exalt the *status* of the dental profession, and that all animosity would cease from the present moment. [Applause.]

Mr Dobie begged to be allowed to express the gratification and high degree of pleasure which he had experienced in listening to the report of Dr Richardson, and also in hearing the satisfactory statement as to the prospects of the Society which had just fallen from the Chairman. He had come up to London for the express purpose of attending this meeting, and he should return to his practice in the country highly gratified and fully rewarded. He begged to move a vote of thanks to the Chairman.

Mr Betts seconded the motion, which was then carried unanimously.

The Chairman.—I most humbly and most affectionately thank you for this mark of your respect. I am sure you will allow me to pay the meed of praise which is due to the other branches of the profession. We have many eminent physicians who have sent in their adhesion to us, offering their services to forward our views in every respect; and a great number of members of the College of Surgeons of England have assisted us, and are glad to find that we are going on well. This gives us encouragement to do our utmost night and day to carry on the College of Dentists of England. I am sure that I ought to pay that meed of praise which is due to them as well as to the other branches of the medical profession for helping us, they consider that we ought to be an independent body entirely; and such being their feelings, I hope the College of Dentists of England will live to become an entirely independent body. I thank you for your kind attention, this evening terminating the present session; and I hope we shall meet in health and strength to carry on the ensuing one.

The proceedings, which had been of a highly gratifying character throughout, were then brought to a close.

COLLEGE OF DENTISTS OF ENGLAND.

At a Meeting of Council held on Friday, June 24th, George Waite, Esq., M.R.C.S., Member of the College of Dentists, was elected President of the College.

At the same meeting Somerset Tibbs, Esq., of Cheltenham, Member of the College of Dentists, was elected a Vice-President.

The following gentlemen have been elected Members and Associates of the College:—

Members.—Messrs T. Hankins, Manchester; R. T. Hulme, M.R.C.S., F.L.S., London; G. Henry, London; and B. Wilkins, Northampton.

Associates.—Messrs J. T. Cunningham, Islington; and R. Donaldson, Carlisle.

At the moment of going to press we have the pleasure of hearing that George Waite, Esq., of Old Burlington street, has been elected President of the College of Dentists.

We heartily congratulate Mr Waite on the honour thus conferred on him by his brethren. Mr Waite, who is well known in the profession as a scholar and eminent practitioner, has hitherto stood apart from all political divisions. His union with the College as President shows that his sympathies are in accordance with those principles of independence on which the College was founded.

For the same reasons we congratulate S. Tibbs, Esq., of Cheltenham, on his election as a Vice-President of the College. Few men are more deservedly popular than Mr Tibbs.

Obituary.

On the 31st of March, at the Cape of Good Hope, Hubert Shelley, M.B., M.R.C.S., aged thirty-four. The subject of this brief obituary notice, Mr Hubert Shelley, was known in the Metropolis as Dentist to the University College Hospital. Mr Shelley was evidently a young man of promise. He was for some time Editor of the British Journal of Dental Science, at a period when an editorial pilot was required, who had experience, firmness, and conciliation as the ruling faculties. He, wanting in these, and possessing some fragment of the reckless vigour of his poetical namesake, was unhappy, to say the least of it, in his literary labours, inflicting personal sarcasm on men who had given him no cause of offence, except that they differed from him in political feeling, and creating divisions among his brethren, instead of unity. Lost to us now, before time gave him opportunity to bring into more useful action his sterling qualities, we would forget the indiscretions into which he was led, and retain only the remembrance of his scientific career.

NOTICES TO CORRESPONDENTS.

⁂ For the convenience of those who intend to bind the Review at the end of the year, and to prevent disappointment, it is requested that subscribers will carefully preserve the several numbers, as of the back ones very few remain.

⁂ Encouraged by the success which this Journal has obtained, we have determined to spare neither trouble or expense in making it still more worthy of the support of the Dental Profession. By the kindness of Mr Hulme, F.L.S., we are enabled to present our readers with a translation of M. Natalis Guillot's celebrated Treatise on The Development of the Teeth and Jaws, which is commenced in the present Number. To illustrate the Author's text, we have secured the services of competent artists. Plate 2, to which reference is made, will appear in its proper place in the next number.

⁂ Owing to the length to which our report of the proceedings at the College of Dentists extends, we have been compelled to omit the Correspondence in this Number; for the same reason several interesting communications are postponed until next month.

The Articles on Chemistry will appear on alternate months.

Scrutator.—We have forwarded your letter to the Secretary of the College of Dentists.

A Young Beginner.—We are informed that the arrangements for Examination at the College of Dentists will be completed by October. You are, however, eligible for Membership without examination, if in actual practice on or before the 20th day of April last. You can obtain further particulars on application to the Secretaries.

Letters, communications, &c., have been received from Dr Richardson, Mr Robinson, Mr Campbell Dundee, Mr Hulme, Mr A. Canton, Mr Hughes, "A Young Beginner," Mr Rymer, Mr Harnett, "Scrutator," Mr Hockley, Mr Perkins, Mr Harding, Mr Matthews, &c., &c.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED.

Dental Register of the West, for June,—*in exchange.*

The Dentist, for April. Berlin.

THE

DENTAL REVIEW.

JULY, 1860.

PROFESSIONAL ORGANISATION IN FRANCE.

THE movement for the complete organisation of Dentistry into a distinct Profession, first successfully commenced in America, and followed up partially in this country, is now progressing throughout the world. We give to-day, in another part of the REVIEW, a report of a Meeting of Dentists lately held in Paris, for the purpose of establishing in that great centre of science and advancement a Dental Institution, to embrace in its membership all the good and the worthy of the Profession in the Imperial dominions. It would seem that so early as 1845 the same excellent object was attempted. It does not appear, however, that the attempt was very successful; the organisation dragged on until the disastrous 1848, when crowns falling first, and ministers following, but little chance was left to the well-intentioned but feeble Dental Society. It had the honour of falling with a king, and since then, although not exiled, has remained in oblivion.

The effort now being made is towards reorganising the defunct Dental Institution. The Members of the old Society have been called to meet the advocates of the new, and the outline of the new Society itself has been discussed in a manner which promises, under certain conditions, to be productive of a good understanding and an ultimate success.

We refer to this matter on the present occasion for two reasons: first, that we may congratulate our Gallic neighbours and brethren on the prospect which this new work opens to them; and secondly, because there is something in the policy of the founders of the new Society which is especially interesting to us, as being a reflex of what has occurred at home. Our French friends hold up to us a mirror, the surface of which is true to a fault.

In America, where all government is comparatively new, every new society taking its copy from the Federal Government itself, proclaims an independence, and from the first, if it can stand at all, stands alone. Thus, when Dentists began to organise in the United States, they went hand-in-hand to one principle—Dentistry the one and definite Profession, and Dental Education and Qualification the one and definite act of the Profession. On minor points there might be differences, but this major proposition admitted of no gainsaying. Hence the rapid progress of Dental Science on the American Continent; hence the origin and continued development of Schools and Colleges which elsewhere no country can boast of possession. The Dentists of America have been free, and their freedom has secured for them, as it always does when it runs not into madness, advantages which other nations may envy, but do not as yet approach.

In this country we could not begin our organisation in the same freedom; we have had to fight to win. Linked by a very loose and doubtful tie to Medicine, we have been driven to endless hardships in trying break this link off, not because Medicine wants us, but because a few of our own body want it, and cling to it with desperate servility.

In France we see the same evils at the basis of this renewed effort towards organisation. It will be seen from the report of the meeting which we quote, that there are two propositions put forward. One, on the free and open principle, proposes to admit to the Society all Dentists who will undertake to obey the Society's laws, and to practise with integrity. Further, it aims to place Dental Education and Qualification entirely in the hands of Dentists, but legalised by the State. The other suggests an existent Medical qualification as the desideratum for enrolment in the new lists. On these questions a canvass of the Dental Profession in France is now being instituted.

Of the result of that canvass we have but little doubt. Political feeling in France, hidden by the stern power of the Government, is not, we admit, daily expressed ; but there is, nevertheless, a strong under-current of liberty, and, if we mistake not, its existence will be shown on this occasion in the expression of an almost universal vote in favour of the independent proposition. Granting, moreover, this proposition carried, we expect, in the end, more of this Continental Association of Dentists than of any other in Europe ; for Frenchmen, having once started on a given track, notwithstanding all that is said to the contrary, continue faithful to their duty, and are ever ready to sacrifice themselves to the advancement of a principle. If, on the other hand, in the course of fate, by some unhappy chance the despotic centralizing spirit should prevail, we can expect a progress for Dentistry in France even less slow in its development than in our own land. There will be a dignity truly in giving every Dentist the University degree, and this in France is a *real* dignity ; but it will be purchased at a heavy price ; it will create a standing order, and therewith an obstacle to all that expansion of intellect and science on which alone men become truly great as men, and nations truly great through the units of which they are composed.

If, for ourselves, we could reach, with any voice capable of producing effect, our neighbours on the other side of the Channel, we would urge them solemnly, recalling our own history, to be as one in accepting the first proposition addressed to them. By ignoring from the beginning all extraneous pretence of support—by relying from the first on themselves and their own efforts, they will save themselves our exhaustions and annoyances, and will set before many of their English compeers an example which cannot be too often or too extensively demonstrated.

DENTAL SURGERY AND MECHANICS.

DESCRIPTION AND APPLICATION OF A NEW FLASK FOR THE MANUFACTURE OF THE VULCANITE BASE.

THE flask hitherto adopted by the Profession has been composed of three pieces—viz., a base, a middle section or ring, and a cover. In the use of this flask various difficulties have presented themselves, particularly to those who have used the vulcanite extensively. The first has been the removal of any substance upon which the teeth have been placed without destroying their arrangement. Where wax has been used, this difficulty has been overcome by the use of boiling water or dry heat; and where gutta-percha has been used, by holding the teeth in the plaster contained within the middle section of the flask. But this process almost necessarily leads to derangement of the articulation; at all times an inconvenience, but with Vulcanite work a very great and sometimes destructive error. Another difficulty in the use of the flask just described applies to a certain extent to both of these methods; for in cases where the teeth are embedded in the plaster connected with the base of the flask, the plaster which contains them sometimes breaks, from being deprived of the support of the sides of the plaster contained in the middle of the section, at the time when it is most particularly required. When the rubber is in its first stage of packing, it is obvious that the two parts of the mould cannot occupy their normal relative position until such rubber is pressed home; and if there be any superfluous rubber, the two surfaces never can approximate closely: hence the plaster containing the teeth is deprived of its greatest support, and is always liable to yield to the pressure applied in screwing the two parts of the flask together. The other method mentioned, where the teeth are left in the middle section of the flask, escapes this objection with reference to the artificial teeth; but, from the absence of support just mentioned, the plaster teeth yield, and a layer of vulcanite is deposited between the fractured surfaces of the teeth and the model, thereby destroying that accuracy of fit which is the great advantage of the vulcanite.

The distinctive feature of the new flask is the use of an additional section or ring, increasing the number of pieces to four instead of three. The manner of its use is, as nearly as possible, as follows:

The model, which must be cut as shallow as possible, is placed in the base of the flask, and the imbedding plaster brought up to the lower edge of the modelled piece; *all the teeth, whether on the gum or otherwise,* being left exposed and free from plaster. When this first layer is set and trimmed off, and its surface rubbed over with some non-adhesive material, the second part of the flask is placed in position and secured to the base by three iron pins, and the second layer of plaster introduced, which being carried over every part of the teeth not to be covered by vulcanite—such as the face and part of the palatine surface of the fronts, and the face, crown, and part of the lingual surface of the molars—affords them a very secure bed which is not liable to be broken away, securing thereby the retention of the teeth in their proper position. This second layer having been trimmed off and prepared in the same manner as the first, the third section of the flask (which represents as nearly as possible the middle section of the flask now in use) is laid on, filled with plaster, and covered by the lid. The mould being thus completed, is placed in a heated oven or boiling water, to soften the wax, and allow of its removal without disturbing the teeth. The upper section of the flask is then removed, leaving the second portion in which the teeth are held attached to the base. When the pins are withdrawn and this section taken off, it will carry the teeth along with it, leaving the wax or gutta-percha upon the model, from which of course it can be easily removed.

If by undue adhesion to the wax any of the teeth should be detached, they can be replaced, and securely held in position by the application of what is known to us as "Ash's Mastic Cement," the form of the bed which grips the teeth making very little adhesive power necessary. When the wax is removed, the first section is returned to position and secured by pins as before mentioned. At this point an advantage arises which it may be well to mention. In many cases it may have been observed, that when a case is finished the body of the vulcanite is much thinner under some teeth than desirable, caused, perhaps, by some peculiarity of the model. Now, as by the use of this additional section a clear view is obtained of the space between the teeth and gum, so also can any tooth be removed for the purpose of grinding, thereby increasing the thickness of the vulcanite.

It will be seen from what has been stated, that any substance can be removed from the model with facility, without deranging the teeth, and that, in the operation of packing, neither the supports of the teeth for the case nor of those which may be on the plaster model are deprived of any strength whatever; the plaster which holds them being always enclosed in the metal ring into which it was originally cast, thus avoiding the possibility of breakage.

The great advantage of this flask appears to be, that no derangement of the position of the teeth or alteration in the articulation of the piece can take place during the various manipulations. The merit of its introduction is due to Messrs Bell and Turner, and its manufacture has been undertaken by the Messrs Ash, who, we have no doubt, will bestow upon it their usual amount of care and attention.

Treatment of Neuralgia by Electricity.—In a paper read before the Academy of Medicine, M. Becquerrel strongly recommends the treatment of Neuralgia by powerful currents of electricity, which has proved highly successful in his practice, statistics being furnished which show that nineteen cases of sciatica, and twenty-three cases of lumbar, intercostal, crural, and trifacial neuralgia, many of which were of old standing and not amenable to other remedies, were all perfectly cured by the judicious use of powerful electric currents. The principle upon which this mode of treatment depends is as follows:—If intense currents of electricity are applied in the course of a nerve, its sensory power is benumbed for a time: an analogous effect is produced if an electric shock be communicated to a nerve which is the seat of neuralgic pain, the morbid sensibility becoming diminished and annihilated under the influence of strong currents repeated at rapid intervals. Sometimes the disease disappears entirely after a single operation, but it more generally returns after a variable period of from a few hours to a day or two. As the electrisation is repeated, the recurrence of the neuralgia is always at greater intervals, and the pain becomes less intense, until, finally, a cure is completed, for the perfection of which from three to fifteen applications, each of two to five minutes' duration, are necessary. In employing this treatment in cases of trifacial neuralgia great precaution is requisite, as otherwise, either cerebral congestion, or obstinate headache, never in themselves dangerous, but yet alarming and distressing to the patient, may occur.

ON A CASE OF FRACTURE OF THE SUPERIOR MAXILLA AND ITS TREATMENT.

By JAMES SALTER, M.B., F.L.S.,

Surgeon-Dentist to Guy's Hospital.

(*From the 'Lancet,' June* 16.)

I have thought that the Profession might be interested in the particulars of a case of fracture of the superior maxilla, in which I adopted an unusual and, as far as I know, a new mode of treatment.

My patient was a young gentleman, the son of a clergyman in Berkshire. On Saturday, April 17th, 1859, while playing cricket, he was rushing with great impetuosity to catch a ball, when one of his companions, not perceiving him, ran forwards with a similar object, and they came into violent collision, my patient receiving a blow from his fellow-cricketer's forehead on the upper jaw, immediately below the right malar bone. A distinguished general practitioner in the neighbourhood was at once consulted, and he found, upon examination, that a fracture of the maxilla had occurred, driving inwards the two right upper premolar teeth and first molar, with their containing alveoli.

On the 19th of April, his professional attendant brought his patient to me for consultation, as some difficulties had occurred in the treatment of the case. The condition of the patient when I saw him was as follows :—A fracture of the jaw had occurred immediately behind the canine tooth, apparently passing vertically up to about the summit of the fangs of the premolars, and then extending at right angles horizontally backwards nearly, if not quite, to the posterior extremity of the bone. The anterior portion of the fractured bone was driven inwards upon the roof of the mouth to the extent of about the third of an inch; while the second molar tooth, implanted in the posterior portion, remained unmoved, the broken bone being, as it were, a radius, of which the second molar tooth was the fixed axis. The projection of bone into the roof of the mouth led to a corresponding depression on the outer side of the jaw, and this was somewhat apparent also on the face. Very little swelling had occurred, nor was much pain felt, except on manipulation. There was, however, considerable inconvenience experienced from the fact that the displaced teeth no longer opposed their fellows in the lower jaw by a normal "bite;" the cusps of the teeth, instead of interlocking with their inferior opponents, met them more or less on the points, and the mouth could not be satisfactorily closed.

On endeavouring to force the displaced bone into its proper situation, considerable pain was produced; it could not be got thoroughly into position, and when the pressure was removed the bone almost immediately resumed its former direction—projecting inwards. During this manipulation distinct crepitus could be felt.

To meet what appeared to me the requirements of this case, I adopted the following plan of treatment:—I prepared a gold plate to fit the interior of the mouth, so as to hold the displaced portion of bone as much as possible in position, thus far acting in every sense as a splint, but with the additional advantage that it was capable of repeated alterations from time to time so as still further to force outwards the inward projecting bone and teeth, as the patient could bear the pressure. I first took an accurate model of the mouth, and upon this the plate or splint, whichever it may be called, was constructed, embracing two of the firm teeth on the left side—namely, the first molar and second bicuspid; then, passing over the palate behind the incisors and canines, it was made to bear on the right side against the displaced teeth and bone, extending still further backwards and surrounding by a wire the second molar tooth, which had not been displaced. The plate was so constructed that it exercised pressure only on the bone and teeth which were displaced, and in amount in proportion to the displacement—most upon the front of the broken bone and the first bicuspid, less upon the second bicuspid, and still less upon the first molar.

The accident occurred on the 17th of April; I first saw my patient on the 19th, and on the 23rd the apparatus was applied. When the plate was first put on it was very tight, and produced considerable pressure on the inner side of the fractured bone, causing, however, a sense of tension rather than pain. In a few hours this feeling passed off, and when, four days after, I next saw my patient, I found the position of the parts very much improved. This improvement was followed up, and still more advanced by altering the plate—making it wider, and by adding portions of gold within the crescentic excavations that received the teeth. From this date, the 27th of April, my patient visited me about once a week, the plate having in that time ceased to produce any pressure, or exercise any influence requiring further alterations, till the 2nd of June, when, as I find from my notes, the maxillary arch was completely restored to its proper shape.

After this the plate was worn for many months—longer, I think, than was required, the patient getting used to it, liking it, and feeling it a comfort and support. I cannot, therefore, name the precise date when osseous union may be said to have taken place; but it has taken place, retaining the fractured bone in a proper position.

I do not see what other method of treatment could have succeeded in this case. Probably, had no mechanical support been employed, the already-existing obliquity of the teeth would have been increased by the pressure of mastication, and certainly could not have been diminished; but by the means adopted, stability of the detached bone was secured, and its position gradually and progressively improved, till it assumed, almost, if not quite, its original place.

As it seems to me, important as this mode of treating a fracture of the *upper* jaw may occasionally become, the same principle as applied to the *lower* jaw is of still greater service. Any displacement that accompanies fracture of the superior maxilla is simply a passive condition: there are no muscles attached to the upper jaw which can derange or draw out of place the broken bone. With the lower jaw, however, the case is very different. The inferior maxilla is a floating bone, to which many powerful muscles are attached, and those connected with the rotating movement of the jaw—namely, the pterygoids—having a strong lateral antagonistic action. Destroy the integrity of the maxillary arch by fracture, and that antagonism ceases: the muscles on either side act independently, and draw the points to which they are attached more or less to the mesial line, and this it is which causes the overlapping of the fractured ends of the bone, often so obstinate, and necessarily with it the traction of the chin towards the side on which the fracture has occurred in the usual cases, where the lesion is in the horizontal ramus on one side. A plate or splint, and for the lower jaw I prefer an ivory one, carved to fit the interior of the arch of the particular jaw, with small crescentic excavations for the existing teeth, when placed in the mouth, restores the integrity of the arch for the time being. It may be worn without inconvenience long enough to allow osseous union of the fractured ends, preventing displacement the while.

Not long since I was consulted by a professional friend in such a case as this. The fracture had occurred in the horizontal ramus, about the situation of the first molar tooth, and this tooth, as well as the second premolar, had long since been extracted, and the usual method of treatment—that of tying together teeth in the neighbourhood of the fracture—could not be resorted to. The displacement of the jaw, and the consequent distortion of the face, were extreme. The fracture had occurred on the right side: the left pterygoid muscles, being no longer resisted by the right, drew over the mass of the bone—the left horizontal ramus, chin, and anterior portion of the right horizontal ramus—towards the right side, and to such an extent that the left lower canine tooth corresponded in position to the interval between the superior central incisors. My friend and myself agreed that the best and most promising plan would be to re-connect the broken and now separate portions of bone by an ivory arch or splint, within the jaw, adapted to its precise form, and attached to the remaining teeth. This plan was adopted with the happiest results, the ivory splint being worn till union had taken place, with scarcely any perceptible malposition of the jaw.

CYSTIC GROWTH OF THE LOWER JAW.

By Edward Hutton, M.D., F.R.C.P.S.

(From the 'Dublin Hospital Gazette,' June 1st.)

The case was that of a young woman, Ellen Nicholl, æt. twenty, who was admitted into the hospital on the 29th of last October. The tumour extended from the angle of the left side of the lower jaw to an inch on the right side of the symphysis, and projected likewise into the fauces. The tumour was hard, and generally of firm consistence; on its mucous surface, for the most part, it presented the same characters, but at some few places was soft, and gave a distinct sensation of crepitation on pressure The alveolar process was diseased, and partially absorbed; the teeth were loosened, and the tongue was pressed towards the right side. At one or two points there was a discharge of purulent matter, and it was quite evident that the disease was extending itself gradually towards the entire circumference of the lower jaw. At one of the points where fluctuation was most perceptible a puncture was made, and a small amount of glairy, honey-like fluid was given exit to.

The history of the case, as gathered from the patient's own account, was this :—The tumour had existed for upwards of nine years. When about eleven years of age, she received a severe blow on the jaw, and soon afterwards a swelling appeared on the bone; this continued to increase in size for some time, and then became stationary. For several years after this the tumour made very slow progress, so that three years ago it was not larger than a walnut; after this its growth was more rapid. One or two teeth had been loosened and displaced.

On her admission into hospital the tumour had attained a much larger size. During its growth she suffered from sharp, stinging pains occasionally, giving her the sensation as if sharp-pointed needles were running into the jaw. The pain was not constant, but occasional. She never suffered from it during the night; but when she used any exertion, especially in stooping, these stinging pains became very distressing.

It appeared that the young woman had placed herself previously under the care of a medical gentleman in the country. Iodine was administered, and an abscess having formed, it was opened externally, when some purulent matter, mixed with blood, escaped. No reduction, however, took place in the size of the tumour. So long as the disease did not interfere materially with mastication or swallowing, the girl remained without seeking for any further medical or surgical aid; but when the tumefaction began to increase materially in size, and to push its way inwards towards the pharynx, she became alarmed, and by the advice of her friends came up to town and entered the hospital.

Having carefully examined the case, I came to the conclusion that the disease was one of those cystic tumours such as have been described so graphically by Dupuytren in his 'Leçons Orales,' and that there was but one course open to us in order to relieve her, viz., the removal of all that portion of the lower jaw which was the seat of the disease. In this opinion my colleagues fully coincided. The operation was performed on the 4th of November, in the same manner as in the case so successfully operated on by Mr Cusack (vide 'Dublin Hospital Reports,' vol. iv.). The patient was placed sitting on a high-backed chair, and was firmly secured in it. Chloroform was not administered, as we were unwilling to run the risk of suffocation being produced by hæmorrhage, consequent on the operation. Two days previous to the operation the first bicuspid tooth on the right of the symphysis was removed by Mr L'Estrange, in order to make room for the working of the saw.

An incision was made from above downwards, midway between the right commisure and the middle line, *not, however, cutting through the free border of the lip, but beginning about a quarter of an inch below it.* This incision was carried down to the bone. A bistoury was then passed from below upwards behind the bone, to make room for the chain-saw, which was then passed behind the lower jaw, and made to cut from within outwards. The bone was here abnormally dense in structure, almost of the consistence of ivory, and in consequence the chain-saw gave way. The section of the bone was completed with an ordinary small dovetailed saw.

The next step in the operation comprised a horizontal incision, commencing at the point corresponding to the angle of the jaw, and following the line of the base of the diseased jaw. On dividing the facial artery it was immediately secured, and the incision continued on until it met the former incision at right angles. The bone was then cut through at the angle, and the diseased mass of bone was then exposed and removed with comparative ease and facility.

On the division of the muscles connecting the tongue with the symphysis of the lower jaw, the tongue had a tendency to retract; but this soon entirely ceased.

After the tumour was removed, there was some hæmorrhage; but the bleeding vessels, which were not many in number, were easily secured. During the day there was some slight hæmorrhage, which, however, was easily arrested by pressure. Wine and other stimulants were administered immediately after the operation by means of an elastic tube, which was attached to the mouth of a drinking-vessel.

Throughout the remainder of the day on which the operation was performed, and the succeeding day, the patient suffered from the greatest mental depression, continually giving signs of despair of ever recovering. Her pulse was very rapid and weak. There was, however, a marked improvement on the evening of the second day. She was fed now by means of a large gum elastic catheter fastened to an indian rubber bag, the catheter being passed down until its extremity reached the pharynx. Beef-tea was carried into the pharynx by gentle pressure, and was thus easily swallowed.

She was fed in this way three or four times a day; and her recovery progressed rapidly, not a single bad symptom manifesting itself. The wounds healed with remarkable rapidity, a great portion uniting by the first intention.

This tumour belongs to the benign class of cystic osteo-sarcomatous tumours. There are displayed in its interior, here and there, a series of cancelli or bony cells—in other places they are softer and more yielding. The interstitial cells were found filled with the glairy fluid before mentioned as being like liquid honey.

In this instance, in not cutting through the red border of the lip, I deviated from the operation described by Mr Adams in a similar case detailed in a previous number of this journal. He strongly recommends the vertical incision through the red border of the lip. He says: "The union of such a wound," alluding to the division of the lip, "need not of necessity be attended with deformity, if the incision through the lip be only made as it was here, not at the commissure, but at a little distance from it, near the middle line." The only advantage, however, that he mentions as resulting from this proceeding is, that it admits of the exposure of the mass of diseased bone by the flap being thrown up fully on the cheek. I am of opinion, however, that if this division of the lip can be possibly avoided, this will be so much the better, as then the non-occurrence of deformity will become a positive certainty.

I should not omit to mention that one of the cysts of the tumour was divided at the line of section, leaving a small portion at the right side. This, however, did not involve any very unfavourable consequences. Indeed, the disease was not of that malignant and recurrent character rendering indispensable a rigorous extirpation of every trace of the mischief, and no inconvenience ensued from the small portion of the diseased cyst which had not been excised.

In conclusion, I may observe that the disease partook in its early stages probably of the nature of an enchondroma, which in its subsequent progress underwent its cellular or cystic transformation, and of the many and various tumours affecting the lower jaw, both malignant and otherwise, the one that has been now under consideration is the form which most readily admits of safe and effective removal.

ON THE TEETH AND MAXILLARY BONES IN THE HIGHEST FORMS OF QUADRUMANA,

CONSIDERED IN RELATION TO THE SAME STRUCTURES IN THE HUMAN SUB-CLASS.

THE result of greatest interest obtained by the labours of comparative anatomists is the exact limitation of the structural relation subsisting between Man, the crowning creation in the Mammalian series, and its highest inferior developments. All ethnological science must have for its foundation the due appreciation of such limitation ; all advances in the physical history of our race must be made from its boundary-line. If, as we hold, Man be a separate creation, not merely the educated and developed progeny of some anthropoid Simia, it behoves us to demonstrate with profoundest care where and how, in his physical organization, the brutal terminates and the human begins ; to show with utmost nicety its correlation and distinction, to measure and gauge with exactitude the barriers by which the Creator has surrounded from all inferior approach the material organism of that being who, made a little lower than the angels, has dominion over the beasts of the field, the fowls of the air, and whatsoever passeth through the paths of the sea.

We may premise that it is to the labours of our countryman, the distinguished superintendent of the Natural History Departments in the British Museum, we must turn, would we sound with scientific precision the depths of the chasm which isolates the mammalian form, when fitted for the reception and furnished for obeying the volition of the reasoning soul. The vast and complex brain, indexed by the expansion of the neural spines of the cranial vertebræ, is without doubt the great distinguishing mark of man. In him the organ of

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'On the Classification and Geographical Distribution of the Mammalia.' By Richard Owen, F.R.S. London, 1859.

'Catalogue of the Osteological Series in the Museum of the Royal College of Surgeons.' 4to, 1853.

'On the Zoology of the Chimpanzee and Orang-utan.' By R. Owen, F.R.S. Zool. Trans., vol. i. London, 1835.

'Osteological Contributions to the Natural History of the Orang-utans.' By Richard Owen, F.R.S. Zool. Trans., vol. ii.

'Osteological Contributions to the Natural History of the Chimpanzees.' By Professor Owen. Zool. Trans., vol. iii., 1849.

'Osteological Contributions to the Natural History of the Chimpanzees and Orangs.' By Professor Owen, F.R.S. Zool. Trans., vol. iv., 1858.

the mind is separated from the brain of the anthropoid Apes, not only by its greater size—though that distinction is so extraordinary that the average volume of the lowest Australian or negro brain is more than double that of the huge and formidable Gorilla—not merely by a greater complexity in the structure of convolutions common both to himself and the higher catarrhine Quadrumana, but by the absolute superaddition of new parts. The human *cerebrum* not only covers and overlaps the olfactory lobes and *cerebellum*, but it extends forwards beyond the one, and backwards beyond the other. To the posterior development of the cerebral hemisphere in Man, anatomists have given the name of the third or posterior lobe ; a cerebral region for which we look in vain in all inferior forms, and that is differentiated by its internal structure, by the posterior *cornu* of the lateral ventricle, and the *hippocampus minor*, which form its true anatomical characteristics. It is on cerebral development that Professor Owen rests his most original and philosophical classification of the Mammalian class; and reasoning from the structure of the human brain, he claims for Man to be the sole representative in that series of a distinct sub-class, to which he assigns the designation 'Archencephala.'

But before we apply ourselves to the immediate object of this article, it may not be uninteresting to our readers to inquire, what are the chief differences which must strike an ordinarily scientific observer, in contemplating the skull of Man side by side with the *cranium* of the Great Ape *(Troglodytes Gorilla)*, which has been within the last few years rediscovered on the Western Coast of Africa, and which is held by Owen to be the most anthropoid of Quadrumana. Supposing such a comparison to be commenced by an examination of the skull of the lower animal, the attention of the observer would be arrested by the great size of the whole facial portion as compared with the cranial; the forward or prognathic development of the jaws, furnished with unequal and formidable teeth; the great depth of the lower jaw, and the extent of its ascending *rami ;* the long and narrow palate ; the enormous strength and depth of the zygomatic arches, and the comparatively shallow orbits. In studying the cranial portion, he would notice the proportionately small brain-case, its want of upward expansion, and its relatively forward position on the vertebral column, as evidenced by the place which the occipital condyles occupy far back on its under surface. The enormously strong osseous *cristæ* which traverse the external superficies of the skull, imparting to it an eminently carnivorous character, would likewise claim observation. Of these, the lofty sagittal crest, formed by the junction of the temporal ridges, indicates the powerful muscles by which the animal is enabled to wield its weapons of defence—the huge laniary teeth ; whilst the great development of the posterior muscular ridges (the occipital), taken in connection with the rudimentary condition of the mastoid processes, and the position of the occipital condyles and *foramen magnum*, contrasting strongly with the mechanism by which the human cranium is evenly balanced on the vertebral column, furnishes conclusive evidence of the unfitness of the Gorilla for the free, continued, and unaided assumption of the erect posture. Another distinguishing characteristic would be found in the prominent bar of bone which forms the overhanging superorbital process, and gives to the head its peculiarly forbidding, scowling expression. The scientific naturalist would recognise in this a distinctive feature of far more importance than the developed sagittal crest ; for, independent of muscular attachment, it is essentially a non-modifiable character, and furnishes one of the points by which the African genus *(Troglodytes)* is distinguished from the Orangs of the Indian Archipelago *(Pithecus)*.

On turning, on the other hand, to the human skull, his attention would be directed to the extraordinarily expanded brain-case, which in every race of Man towers high above the bony face, and behind, projecting far beyond the vertebral axis, rises in the form of an hemispherical vault, completing in lofty proportions "the dome of thought." In examining the face, he would again be struck by the restricted development of the facial bones, especially of the jaws, the arch of the palate, the evenness and small size of the teeth—organs evidently solely intended for the comminution and separation of the food, and unfitted for purposes of warfare, either offensive or defensive. The depth and capacity of the orbits, the smooth surface of the *cranium* uninterrupted by muscular *cristæ*, the minor development of the temporal ridges, and the tenuity of the zygomatic arches, would claim observation ; and he would especially notice the plane and central position of the occipital condyles, supporting the voluminous *cranium* and transmitting its weight to the spine. And in associating with this characteristic the development and position of the mastoid processes, only a rudiment of which exists in the great Troglodyte, he would indubitably be led to the conclusion that the erect position is to Man a necessary circumstance of his existence.

The comparison we have thus sketched extends only to the salient characters presented by the two structures,—it has no pretension to be considered a careful osteological investigation. Such a process would disclose many particulars of difference which, although not at first sight so remarkable, are in many cases of equal, and of even greater, scientific value than some of the more conspicuous points of variation. Certain of these will be noticed in the comparative examination we are about to institute of the jaws and teeth in the Anthropoid Apes, as contrasted with the same structures in the Bimanous order.

Our investigation will be restricted to the genera *Pithecus* and *Troglodytes.* It would be foreign to our purpose to enter on the reasons which induce us to follow Professor Owen in ranking the Orangs and Chimpanzees higher than the Gibbons (*Hylobates*). We must refer our readers to a paper on the Gorilla, appended to the Lecture on the Classification of Mammalia, for the details of the masterly argument by which their right of precedence is proved. The genus *Pithecus* (Orangs) includes the large red tailless Apes without ischiatic callosities, of Borneo and Sumatra. Some of the points which distinguish it from the African genus (*Troglodytes*), are the greater length of the upper extremities, and the disproportionate smallness of the lower limbs, as compared with the trunk; the absence of the *ligamentum teres* in the hip-joint; the division of the scaphoid bone of the wrist—the *carpus* consisting of nine bones, as in lower Quadrumana; the inferior development of the innermost of the five digits of the foot; the possession of twelve pairs of ribs (the Gorilla and Chimpanzee have thirteen); and the absence of the super-orbital ridge. It includes two well-defined species. Of these, the Great Orang, or Pongo (*P. Satyrus, P. Wurmbii*), is characterised by a superiority of size and strength, by a greater development of the cranial *cristæ,* by the large size of the canine teeth, and by the presence of cheek callosities. The smaller species (*Pithecus Morio*) is somewhat more anthropoid. Besides other points of difference, it is marked by the absence of cheek callosities; and the superficies of the skull exhibits a want of those osseous *cristæ* which indicate the superior muscular development of the larger species.

The habitat of the genus *Troglodytes* (Chimpanzee) is an intertropical region on the western coast of Africa. It also is represented by two species differing in size. Of these the smaller (*Troglodytes niger*) is the Chimpanzee with which naturalists have been long acquainted. Like the smaller Orang, it is distinguished from its more formidable congener by the minor development of the muscular *cristæ* of the *cranium;* but, in addition, there are other and more important specific differences, to some of which we shall advert as we proceed. The large species is the *Troglodytes Gorilla,* whose structure affords the nearest approach to the human organisation exhibited in the Quadrumanous series. A few only of the characteristics on which his superiority rests can be noticed here. The Gorilla possesses a brain of absolutely greater size than any other Ape. In him the premaxillary bones and four incisor teeth are of relatively less breadth than in the Chimpanzee. The median coalesced margin of the upper half of the nasal bones is slightly produced forwards in his *cranium,* indicating an approach to a nasal prominence. Mastoid processes also are present—rudimentary, indeed, but unmistakeable. The comparative length of the upper and lower limbs presents a closer assimilation to human proportions, whilst the opposable thumb of the hand is of relatively greater size than in the Chimpanzee. The iliac bones are broader and bent forwards, forming a pelvic concavity. In his huge hind hand the *calcaneum* has a more decided backward projection, the innermost digit is of greater thickness, and in the whole organ a nearer approach is made to a plantigrade foot than is to be found in any other Simia.

Such are the genera and species presented for investigation. Although we confine ourselves to an examination of the teeth and the bones in which they are implanted, yet the inquiry is not to be considered of trivial importance; for, if the universal testimony of naturalists is to be received, it may be laid down as an axiom, that with the exception of the brain and the concomitant development of the cranial vertebræ, no organs present surer and more significant grounds for specific and generic differentiation than those which constitute the dental apparatus of the Mammalian.

In Diphyodont Mammalia, the upper jaw is fixed, and is formed of three bones on each side—the inter or pre-maxillary, the superior maxillary, and palatine. The teeth are confined to two of these, the pre-maxillary and superior maxillary bones. In scientific nomenclature, those which are implanted in the former are termed, irrespective of their shape, development, or uses, incisors. The canines or laniaries are those which are situated at or near to the suture which unites the pre-maxillary with the superior maxillary. The next in order are the *premolares,* which replace the milk molars of the first set; and behind those are the true molars, which are preceded by no deciduous teeth, but which are in fact a continuation of the first series, for they are developed in the same groove in the fœtal gum; they are always most posterior in position, and are usually of larger size and more complex form than the premolars.

Each of the three bones we have mentioned enters into the formation of the bony palate: it is with its examination we would commence our comparison. In Man the palate forms an arch, the breadth of which, after slightly increasing as far the space between the first true molar and the second premolar, begins to diminish at or about the posterior border of the second premolar tooth. Its base is divided into two lateral concave emarginations by a median point of bone, which projects backwards, and gives attachment to the thin muscular fasciculi forming the *azygos uvulæ.* The surface is divided by a longitudinal and transverse suture; the former marking the separation of the palate and the maxillary bones of the two sides; the latter, that of the palate from the maxillary bone of the same side. The longitudinal suture is interrupted near its anterior termination by a *foramen,* the prepalatine or anterior palatine, which is situated almost immediately behind the alveolar border of the middle incisors, the intervening space being scarcely more than a line in breadth. Near the posterior margin of the palatal surface, at the base of the alveolar border, are also situated two *foramina,* one on each side, the posterior palatine. The anterior palatine *foramen* communicates with the nasal fossa by four *foramina,* or short canals, which open into it: two are placed side by side transversely, and two in the median line. The two former are termed incisor *foramina.* The great importance of the position of the prepalatal *foramen,* as a human characteristic, will be at once evident when we remember that it is a guide by which may be invariably estimated the original depth from before backwards of the palatal processes of the premaxillary bones. The existence of these bones as separate structures in the human skull has been denied by many writers, and even in the earlier periods of fœtal existence they have never been observed to be entirely separable. In the human infant, at birth, they are completely anchylosed with the maxillary; yet, in the early conditions of intra-uterine life, traces of the palatal and nasal portions of the maxillo-intermaxillary fissure are observable, although investigation has never, we believe, succeeded in tracing the line of separation through the external alveolar plate: in this situation, therefore, the two bones in man may be held to be connate. The significance, however, of the early traces of a maxillo-intermaxillary suture in the human fœtus acquires considerable force from an aberrant condition which has been observed in some cases of hare-lip. In certain instances of this deformity, a detached piece has been found corresponding to the line of fissure existing in the early fœtus, the separation extending, however, completely through the *alveolus.* The true nature of the portion thus isolated is proved by the fact of its always including the incisor teeth, and never the canines. It may be added, that no other portion of the superior maxillary bone has ever been found permanently separable. Science is indebted to the illustrious author of 'Faust' for first demonstrating the value and import of the incisive fissure in the human embryo.

We have seen, then, that the chief characteristics of the palate in Man are, its shape, that of a regular arch; the early and complete obliteration of the suture between the maxillary and intermaxillary bones, and the consequent sole division by median and palato-maxillary sutures; the form of the posterior margin or base of the arch; and the position of the *foramina,* especially of the prepalatine. It remains to compare, in these respects, the bony palate in the Orangs, Chimpanzee, and Gorilla. In all the Anthropoid Apes the palate is of an oblong shape. In length it far exceeds the longitudinal diameter of the human palate, and its breadth continues undiminished forwards as far as the interval between the first premolar and canine teeth. The lines formed by the *alveoli* of the true molars and premolars on each side are nearly parallel; they do not converge in the region of the bicuspids—on the contrary, in *P. Satyrus, Tr. Gorilla,* and to a less extent in *Tr. niger* and *P. Morio,* the width of the palate increases opposite the premolar teeth. In the Gorilla, the entire length of the palatal superficies is greater than in *Tr. niger* or *P. Satyrus;* but it is narrower, and, as we shall notice, the increase in length is not due to a relatively longer palatal portion of the premaxillary bone. The posterior margin of the palate in *P. Morio* presents an almost straight line, interrupted only by a small median point of bone, and entirely wanting the lateral concavities observed in the human subject. In *P. Satyrus* the margin is somewhat irregular; on each side of the median line is a bony prominence, separated by a notch-like depression. *Troglodytes niger* offers in this particular the nearest approach to the human configuration; for in the Gorilla there is an entire absence of the median osseous spine, the border "presents either a shallow median emargination between two slighter ones, or the whole posterior boundary (in the younger male) is slightly undulated with a general curve concave backwards." The situation of the posterior palatine *foramina* is another point of differentiation. In Man they are situated near the posterior border of the palate ; in the Gorilla they are more anterior, close to the palato-maxillary suture ; in the smaller Troglodytes they are again found nearer the margin; whilst in the Orangs they are situated closer to each other, separated, however, by two tuberosities, which do not exist in the palate of the Gorilla. In addition, in the human palate a larger proportion of the superficies is formed by the palatine processes of the palate bones.

The position and characters of the anterior palatine *foramina* require especial notice. In all the species of Anthropoid Apes their distance from the incisor teeth is far greater than in Man. In an adult male *Tr. Gorilla* the distance from the anterior margin of the intermaxillary bones to the anterior palatal *foramen* was 1 inch 1 line ; in an adult male *Tr. niger*, 10 lines ; in an adult male *P. Wurmbii*, 1 inch 3 lines : in one specimen of *P. Morio*, 9 lines ; in another, 11 lines. The premaxillary portion of the palate is relatively longer in *Tr. niger* than in *Tr. Gorilla ;* whilst in the Orangs a farther retrogression is made in this respect from human structure. The prepalatine *foramina* are in Man blended into a single opening ; in the Gorilla they are somewhat more distinct, and external to each of them another *foramen* is usually present. In the Orangs, the prepalatal *foramen* is much smaller than in the Chimpanzee ; and in the adult skull of *P. Wurmbii*, the course of the obliterated premaxillary palatine suture may be found marked by several smaller *foramina.* Lastly, the period of disappearance of the suture is to be noticed. In Man we have seen it becoming entirely obliterated in the fœtal stage ; in *Tr. niger* it disappears at or soon after the period of the first dentition. In the genus *Pithecus*, anchylosis takes place later during the second dentition. In the skull of an adult Morio, however, figured in the fourth volume of the 'Zoological Transactions,' the suture is still visible. In *Tr. Gorilla* it is partially present in adult life, obliteration only taking place in immediate proximity to the alveolar openings. F. C. W.

[To be continued.]

MEMOIR ON TUMOURS OF THE DENTAL PERIOSTEUM.

By E. MAGITOT, M.D.

(Read before the Chirurgical Society of Paris, April 13th, 1859.*)

Translated by Robert T. Hulme, M.R.C.S., F.L.S.

(Continued from page 277.)

SECTION III.—CAUSES.

The causes which give rise to tumours of the dental periosteum are involved in as much obscurity as the production of tumours in general: we shall, therefore, confine ourselves to pointing out the various conditions under which these disorders were developed in the cases which have come under our notice.

One circumstance worthy of remark is, that all the tumours we have met with occurred in persons of good constitutions, and who had never previously had any tumourous form on any other parts of their bodies. In several instances, patients, who have consulted us on account of a tooth affected with a tumour, have assured us that they previously suffered in the same way, and that they had been compelled to have such teeth extracted, although they had not the slightest appearance of decay. Four of our cases tend to confirm this statement: thus, case 6 refers to a fibro-plastic tumour developed on the right wisdom-tooth of the lower jaw, in a man fifty-five years of age, who had already lost several teeth, some of which seemed to have given rise to those symptoms which are peculiar to tumours. It was the same with respect to case 16. Lastly, cases 13 and 17 also relate to fibro-plastic tumours, and the patients declared, even more positively than the previous ones, that they had experienced precisely similar pains and the same kind of disease in some of the other teeth; one of them (case 13) distinctly noticed that a tooth, which had been previously raised in its socket, had on its roots a soft formation of the same kind as what was attached to the tooth which we had just extracted. These four cases tend to show the possibility of the development of several tumours in succession in the same individual—not, it is true, in the same place, and by spreading to the contiguous tissues, but in the neighbourhood, and on the periosteum of other teeth. Let us add also that the development of two tumours on contiguous teeth has not been observed, and that the succession seems to have taken place at certain distances, either in teeth situated in the opposite jaw, or on the opposite side of the same jaw. The anatomical condition of the teeth, each covered with its respective periosteum, and each enclosed in a separate alveolus, is not such as to favour the spreading of a tumour of the periosteum of one to the periosteum of the neighbouring teeth.

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* Baillière, Lond., 1860.

The various affections to which the tooth is liable do not appear to exercise any marked influence on the development of tumours of the periosteum. Thus, caries, for example, the commonest disease to which the tooth is liable, appears to us to have nothing to do with it. The cases we have collected refer principally to teeth which are not affected with caries; and in a small number of cases in which this disease accompanied a tumour, we were unable to trace any connection between the two diseases. Out of the eighteen cases of periosteal tumours, only eight of the teeth were carious, and in three of these the cavities were quite superficial; they had no communication with the pulp, and could not, therefore, give rise to any disturbance. The five remaining teeth were, on the contrary, deeply decayed; but their pulps having been entirely destroyed, either as the result of gangrene or of a purulent discharge, any disturbance was equally impossible. The latter, however, might have been the subject of chronic periostitis, a disease which most frequently succeeds advanced caries, and which might perhaps be of such a nature as to cause the formation of a tumour. But only five out of eighteen teeth were in these conditions, and that number is relatively too small to enable us to establish any definite conclusion as to the cause of the disease. No disease of the tooth, therefore, appears to influence the development of the periosteal tumours.

Other circumstances equally deserving of notice accompany the development of these tumours: thus, the molar teeth appear to be exclusively the seat of these formations. The eighteen cases in the report stand as follows: sixteen of the tumours were attached to molar teeth, and only two to the bicuspids; but of the sixteen molars there were ten first, four second, and one third molar. With regard to the bicuspids, they were both from the upper jaw. The permanent teeth are exclusively liable to them, since we have met with one example in a molar belonging to the temporary set in a child four years of age.

Thus, in our eighteen cases, the number of times which the different teeth were affected is as follows.

Table of Tumours of the Periosteum arranged in the order of the frequency of the teeth affected:—

Ten first permanent molars	7 superior	left	3
		right	4
	3 inferior	left	2
		right	1
Four second permanent molars	3 inferior	left	2
		right	1
	1 superior	left	0
		right	1
Two second bicuspids	2 superior	left	1
		right	0
	0 inferior		0
One first temporary molar, lower jaw, right			1
One first permanent molar, lower jaw, right			1
			18

With regard to the age of the persons, the following is what we have noticed: Every age is liable to this disease. The youngest was four years of age, and the oldest sixty: but of three children attacked by it, one was four years, the second twelve, and the third thirteen years of age; five cases occurred in persons whose ages varied from twenty to forty, and, lastly, ten in persons from fifty to sixty years of age. It would appear, therefore, according to these tables, that elderly persons are more liable to this affection than either adults or children. Whether this is the case or not, the present conclusions rest upon too small a number of cases to possess any real value.

SECTION IV.—SYMPTOMS.

The symptoms produced by the presence of a tumour of the periosteum are of three kinds:—1st, They may be local, that is to say, situated in the jaw, at the part affected; 2nd, They may be seated in the surrounding parts, assuming the form of accidental neuralgic pains in some of the terminal branches of the fifth pair of nerves; 3rd, They may be general, and are then usually produced by the violence of the local disorder.

These three classes of symptoms sometimes occur separately, and sometimes simultaneously. The local symptoms may exist alone; they generally mark the commencement of the disease. The neuralgic affections usually come on afterwards, and seem to depend upon the former; sometimes, however, they appear first, and continue for some time to be the only symptoms, and may thus deceive one as to the nature of the disease. Lastly, the general symptoms only come on at a later period, and depend upon the others; moreover, they are only developed during certain periods of the disease, which we speak of as painful attacks or crises.

At the commencement of the disease, when the tumour only occupies a very small space in the alveolus, the patient generally complains of an aching or dull kind of pain in the jaw. Sometimes the sensation is vague and indefinite, comparable in certain cases to a kind of itching or tickling, which induces the patient frequently to apply the finger or the tongue to the teeth on the affected side; at other times it is situated in the immediate neighbourhood of the disease: the pain is more commonly deep-seated and slight but constant, and may become very wearing, more from its continuance than its intensity. The act of mastication usually increases the pain, so that the patients especially complain of it after their meals. At the same time, the submaxillary glands occasionally become enlarged, either remaining in an indolent condition, or increasing, according to the state of the local disorder. Some stiffness and swelling of the cheek on the affected side may also be present, and sometimes there is tenderness on pressure. Next, the tooth begins to deviate from its original position, generally speaking outwards, in consequence of the constant pressure of the tongue. The gum on the affected side is altered, becoming the seat of a slow inflammation; it separates from the surface of the tooth, and the latter, losing one of its means of support, floats in the alveolus surrounded by a purulent fluid, which is sometimes furnished by the tumour, but more frequently by the edge of the gum. The inflammation of the gum is not generally confined to the part which corresponds to the diseased tooth, but extends to the neighbouring teeth, so that these become painful to pressure, and more or less disordered, according to their proximity to the seat of the primary disease.

In some rare cases, the commencement of the disease is marked by the presence of pain in the neighbourhood of the jaws. The patients complain of pain, usually situated in the skin and on various parts of the face, having the characters of neuralgia. These pains are usually vague and temporary, and occur in several places—sometimes simultaneously, sometimes separately. Thus, the temple, the arch of the orbit, the upper part of the cheek may become the seat of pain, in consequence of a tumour on one of the upper teeth—that is to say, in the track of the emerging filaments, or superficial anastomes of the superior and inferior orbitar nerves; while, in the case of a tumour on a tooth in the lower jaw, the pain is usually situated in the ear, through the auriculo-temporal branch of the inferior maxillary nerve, or along the track of the dental branch of the latter, or in its terminal branches on the chin.

However this may be, when these symptoms show themselves first, although they are usually slight, still, in some cases, they are of a nature to lead to an erroneous diagnosis, in consequence of their appearing before there is any local symptom in the teeth; so that the patients imagine that they are affected with facial neuralgia, and the medical man, often falling into the same error, directs his treatment to the cure of the supposed neuralgia. We have witnessed an instance of this. In the cases, however, of which we are speaking, the neuralgia does not long remain the only symptom; the local phenomena soon show themselves, and leave no doubt as to the real cause of the disease.

In the cases in which the first symptoms are seated in the diseased tooth, or where they occupy the nerves of the face, they always possess the general character of being slight, and of becoming occasionally exasperated under certain influences, but still, on the whole, remaining mild. We term this the *stationary condition* of the disease; a condition whose duration may vary from a few weeks to as many months, and which is followed by the appearance of the symptoms we are about to describe.

In fact, in the course of the ordinary painful condition, there is suddenly set up a new series of phenomena, which are, however, only an exaggerated state of the first disturbances; the whole constitutes a *crisis*, which varies in its duration from five to fifteen days.

Under the influence of some exciting cause, such as a shock to the diseased tooth, a sudden change of temperature, or even without any appreciable cause, the crisis supervenes.

The local pain rapidly increases, and most frequently assumes a lancinating character; the tooth is painful to the touch, even the contact of the tongue is occasionally unbearable; the presence of hot liquids excites the most acute pain, which, on the other hand, is most frequently alleviated by cold fluids; at the same time, mastication becomes impossible. The neighbouring neuralgic pains, which have hitherto been slight and transitory, now become permanent and very intense. They are situated in one or several of the nervous branches which we have referred to, sometimes throughout all the branches and their superficial anastomoses, so that the neuralgia may become hemicranial. The pain, which is seated in the neighbourhood of the organs of sense, may be accompanied with special derangements: thus, we have sometimes observed a certain amount of disturbance in the function of vision where there has been neuralgia in the orbit, also singing in the ear, and even by a certain amount of deafness where there has been neuralgia about the ear.

Symptoms of inflammation are also set up: the cheek becomes swollen and painful to the touch; the swelling sometimes extends further, the eyelids getting involved and becoming another source of disturbed vision; the submaxillary glands are swollen and painful; the gum opposite the diseased tooth swells, laps over its external surface, and assumes a violet tint; sometimes it becomes the seat of a small abscess, the size of a large pea, which continues during the whole of the crisis, without, however, producing any fistulous opening. The inflammation may extend along the jaw; and in the case of a tumour on a lower molar, we once saw it extend to the pillars of the velum palati, and to the amygdaloid body of the same, producing a very appreciable difficulty in swallowing. The tooth becomes loose; it projects more or less from the alveolus, and its crown frequently rises some lines above the level of the neighbouring teeth. The slightest movement of it is extremely painful; and percussion with the handle of an instrument, instead of producing a clear sound, as in healthy teeth, always elicits a dull noise in those which are loose.

Lastly, to this series of phenomena may be added others of a general character. The crisis is then accompanied with fever, want of appetite, loss of sleep, and general cerebral disorder, &c. Sometimes, when the crises follow each other quickly, and are prolonged, the patient may become emaciated; a condition we particularly noticed in a little girl, four years of age, who had been suffering for several months from a tumour which was attached to the roots of a temporary molar.

As may be supposed, the symptoms which we have just enumerated do not always occur in the same order and with the same constancy. Thus, as will be seen from the cases we have recorded, the symptoms may assume every degree of intensity. The first crises were in general slight, and were followed by others which were more severe, but they were rarely accompanied by serious symptoms, as the patient sought relief at an earlier period. Ordinarily, therefore, the attacks are only of moderate intensity. In one case, however, the inflammatory symptoms were so severe, that the cheek became the seat of an abscess. The abscess opened externally, and gave rise to a facial fistula, which only healed up upon the extraction of the diseased tooth. This is the only instance in which we met with this kind of termination in the eighteen cases.

In general, on the contrary, the disorders which constitute a crisis, varying in its duration in the manner we have previously described, gradually subside, and are succeeded by a period of quiet, which is only disturbed by that constant kind of painful sensation which belongs to the *stationary condition*, and by the impediment to mastication. The disorders, therefore, usually terminate by resolution: the swelling of the cheek gradually subsides; the neuralgic pains disappear; the tooth seems to return into its socket, partially recovers its firmness, and may in some rare instances resume its functions. The gum, however, mostly continues separated from the tooth, and the pus arising from its inflamed condition bathes the part around the tooth; the period of quiet is soon followed by another attack, generally more violent than the one which preceded it, and the patient seeks relief from his sufferings in the extraction of the tooth.

However this may be, the alternations of rest and of attacks of pain, which constitute the prevailing character of the disease, correspond to the alterations which take place in the tumour itself.

At the commencement of the disease, the size of the tumour remaining stationary, or increasing very slowly, the pain continues to be slight, sometimes moving about, sometimes confined to the part affected: this constitutes the *stationary condition*. After a certain time, the diseased growth suddenly becomes the seat of congestion ; this causes a rapid increase in its dimensions, and produces a *crisis.* This explains the increased violence of the local disorders, the inflammation of the surrounding parts, and the elongation and displacement of the diseased tooth. In fact, the development of a tumour in the alveolus producing a separation of the surface of the tooth from its osseous parietes, there arises a stretching and distension of the pulp and nervous filaments of the tooth, giving rise to neuralgic pains, which occupy sometimes the tract of the dental nerves, and at other times that of the numerous anastomosing branches of the fifth pair of nerves. Lastly, the congestion; which is a temporary condition of the disease, after having passed through its several phases, usually terminates by resolution, this is mostly accomplished by means of a spontaneous hæmorrhage, which rapidly reduces the inflammation, restores the tumour to its previous dimensions, and causes the several disturbances to cease.

Thus, a state of uneasiness, or of slight but constant pain, the accidental and temporary production of more acute inflammation and neuralgic disturbances,—sometimes, also, the occurrence of general derangement,—constitute, in a few words, the morbid symptoms which characterise the presence of a tumour of the dental periosteum.

SECTION V.—DIAGNOSIS.

The characters belonging to these tumours of the dental periosteum usually present themselves with sufficient distinctness to render their diagnosis easy. The usually healthy condition of the crown, the loosening and displacement of the tooth, the alteration in the state of the gum, the suppuration at the edge of the gum, the pain arising from pressing or from percussing the diseased organ, are all of them symptoms which indicate the existence of this disease: if, at the same time, the patient experiences, along with the characteristic symptoms, alternations of ease and attacks of pain, there can be but little doubt as to the presence of one of these tumours. Nevertheless, as there are several disorders which, under certain circumstances, bear some resemblance to these tumours, and as the pathology of the teeth has been but little studied and is very imperfectly known, we shall take a rapid review of those diseases which might possibly be mistaken for a tumour; we shall, therefore, compare the symptoms which accompany a tumour with those of caries, of facial neuralgia, of periostitis, of abscesses beneath the periosteum, and of tumours of the cement.*

1.—*Caries of the Teeth.*

The symptoms of caries cannot be mistaken for those of a tumour, except when the latter is situated on the fangs of a carious tooth, and when the two disorders have simultaneously attacked the same tooth. In such a case, it is necessary to ascertain whether the caries communicates or not with the pulp-cavity. If it does communicate, then we must learn whether the pulp still remains, or whether it has disappeared. The symptoms which accompany caries being always the result of irritation or of inflammation of the pulp which has become exposed externally, we, consequently, exclude as a cause all those teeth which are only slightly attacked with caries, where it does not communicate with the pulp, and likewise all those in which the pulp is entirely destroyed. We may observe that the eighteen examples which we have recorded belong to one or other of these two series. There remain, therefore, only those teeth which are simultaneously affected with a tumour and with a caries communicating with the still existing dental pulp. Under these circumstances, there may be a great analogy between the symptoms; in both cases, there is pain in eating, neuralgic pains in the neighbouring parts, appearing at various intervals, sometimes with great intensity, then ceasing for a time, but only to return under some fresh exciting cause. The symptoms, however, which are derived from an examination of the parts, easily remove all doubt. Thus, in simple caries, there is no inflammation in the surrounding parts, no alteration in the gum, no pain on pressure, no elevation or loosening of the tooth, and no suppuration of gum. The distinction is, therefore, clear.

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* For some further details of the diagnosis, see the Appendix.

2.—*Facial Neuralgia.*

True facial neuralgia is easily distinguished from the disturbances which are caused by a tumour, inasmuch as there will be no tooth presenting the symptoms and evidences which arise from this disorder. However, when the neuralgic pains form the earlier symptoms of a tumour, some difficulty may arise: in such a case, recourse must be had to a plan which we successfully adopted in one instance—that is to say, we must treat it as a case of facial neuralgia. This treatment, as will readily be supposed, will be useless if the disturbances are the consequences of a tumour; while, on the other hand, it will usually succeed if it is a simple case of facial neuralgia.

3.—*Dental Periostitis.*

The disease whose symptoms bear the greatest resemblance to those arising from the presence of a tumour of the periosteum, is inflammation of this membrane, or dental periostitis, especially when it has passed into a chronic state.

Acute periostitis may attack either a carious tooth or a sound tooth. When it arises in a sound tooth, it mostly occurs in the anterior superior teeth, and is generally the result of an accident, of a change of temperature, &c. When it occurs in a carious tooth, this may at the same time be the seat of general inflammation of the pulp, and the periostitis is then the result of an extension of the inflammation: on the contrary, where the tooth is absolutely deprived of its pulp, the disease must be regarded as an attempt on the part of the organism to get rid of a part which has now become a foreign body.

Under whatever conditions acute periostitis may occur, this disorder is distinguished without much difficulty from a tumour of the periosteum. The symptoms, however, sometimes offer a certain amount of resemblance: thus, excepting that the pain at its commencement is slow and progressive in the tumours, but sudden and unexpected in acute periostitis, it presents the same character; as in the case of tumours, the pain is constant, lancinating, and often accompanied by inflammation in the surrounding parts, by neuralgic disturbances, and sometimes by general derangement of the system. The progress of the disorder in both cases is slow and gradual, and it may terminate in the subsidence of the inflammatory symptoms. It is important to remember that the serious disturbances arising from the presence of a tumour, which we have termed crises, always supervene in the midst of a constant state of pain; a circumstance which does not happen in acute periostitis, which comes on suddenly. This peculiarity would serve in the absence of any distinctive character, but the evidence obtained from an examination of the mouth is sufficient to determine the question. In fact, in acute periostitis the tooth presents very little loosening or misplacement—there is no spongy condition of the gum, nor any suppuration, as in the case of tumours. Thus, then, it will be easy in most cases to distinguish between acute periostitis and the disease of which we are speaking. It is not, however, the same, as we shall presently see, with regard to chronic periostitis.

Chronic periostitis, which usually follows acute periostitis, is distinguished anatomically by the ordinary lesions of inflammation, which it is unnecessary for us to recapitulate; it occurs almost exclusively in teeth which are greatly decayed, and in which the pulp is entirely destroyed. This circumstance establishes a very easy distinction for the very common case of teeth, which are suspected of having tumours, but which are not decayed. With regard to those which are the seat simultaneously of extensive caries and of chronic periostitis, their symptoms bear a strong analogy to those which accompany tumours. Thus, the pains are continuous and lancinating; there are neuralgic phenomena, inflammation in the surrounding parts, swelling and separation of the gum, loosening and displacement of the tooth, abscess at the edge of the gum, often followed by a permanent fistulous opening, &c. Moreover, chronic periostitis is liable at certain times to return to the acute state; and these periodical attacks precisely resemble the crisis arising from tumours of the periosteum. When, therefore, a tooth affected with caries, and in which the pulp has disappeared, shall present the phenomena we have mentioned, the diagnosis might be extremely difficult. However, under these circumstances the proceedings of the Surgeon would not be influenced, since in both cases it would be invariably necessary to extract the tooth. Lastly, we would observe, that the pathological anatomy of chronic periostitis is very different from the alterations which occur in tumours: in the first case, the periosteum is softened, sometimes partially thickened; but this affects more or less the whole membrance, which is highly vascular or impregnated with pus, and sometimes separated from the tooth. In tumours, on the contrary, the alteration is confined to a portion of the periosteum, and the histological characters of the organic changes are very different to those which are noticed in the products of periosteal inflammation. There is still one disorder very closely allied as regards its characters to chronic periostitis, and which Dr Loirac, who has particularly studied it, calls inter-alveolo-dental pyorrhagia;* it most frequently occurs in the anterior teeth of the lower jaw, and is characterised anatomically by the complete disappearance of the osseous walls of the alveolus, accompanied by a purulent discharge of the dental periosteum. Its symptoms consist of slight continued pain; but there is no inflammation of the surrounding parts, or neuralgic disturbances, and its progress is uniform and progressive, presenting none of those alternations of crises and periods of quiet which we have seen occur in tumours. This disease, which is often considered to be the result of the administration of mercury, is easily distinguished by its seat and its characters.

4.—*Abscess beneath the Periosteum.*

Those abscesses which occur beneath the periosteum of the roots, better known as cysts of the roots, have been but little studied. We have met with a certain number of these cases, and have always found them at the extremity of the roots of teeth which were extensively decayed.† The antero-superior teeth appear to be more liable to them than others. Their formation, which is the result of inflammation, usually arises from a partial periostitis, which is confined to the apex of the root. Their structure, which has been examined by M. Robin in three instances, gives the following results:—The mass is globular, soft, easily broken up, and discharges a purulent liquid. It consists of a fibrous envelope, which is the periosteum itself, somewhat thickened, and raised from the surface of the cement by the accumulation of pus beneath it. The symptoms, it is true, present some analogies to those of tumours, but they are generally sufficiently clear to distinguish between the two. Thus, in the case of an abscess beneath the periosteum of the roots, there is no alteration in the gum or suppuration at the alveolar border; and the loosening of the tooth, when it exists, is very slight, and is not accompanied with any displacement of the organ.

5.—*Hard Tumours of the Roots.*

These tumours, which are very rare, are usually formed by exostosis of the cement covering the roots. Their special character is that of being developed very slowly; and as their progress is regularly progressive, their symptoms, instead of presenting those alternations of rest and of exacerbation which accompany soft tumours, are, on the contrary, remarkable for remaining in the same state. Moreover, the tooth, far from being loose, is firmly fixed in the jaw. Lastly, there is no evidence afforded by the gum, so that the diagnosis appears to us to be always very easy.

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* *Puon*, pus; *reiu*, to flow. † See Appendix, note C.

6.—*Treatment.*

In the following brief remarks upon the treatment, it is necessary to divide it into the palliative and the curative. The disease, from its nature, being incapable of a radical cure by ordinary therapeutic means, the patients are almost invariably led by the progress of the disease to demand the extraction of the diseased tooth. If, however, there is some particular reason to preserve the tooth, or the patient will not submit to extraction, we ought then to undertake the treatment of the symptoms.

The palliative treatment is generally directed against the disorder which constitutes a crisis, and should consist, according to the nature of the case, in the use of emollients; in local bloodletting, either by means of scarification or the application of leeches; in the application of revulsives, and the employment of any of the various means which might produce a more rapid cessation of the crisis and restore the part to the *stationary condition*, which is usually very bearable.

The curative treatment, as may be supposed, consists in the extraction of the tooth, the only means which can accomplish a radical cure. The extraction is generally very easy, since the tooth is always more or less loosened; but, as the operation is generally performed during a crisis, which brings the patient to the Surgeon, it is usually accompanied with very acute pain, and may be excessively severe—as, for example, where the tooth is not carious, and retains its pulp and its nervous filaments. In most cases, also, there is considerably more hæmorrhage than in an ordinary extraction. This arises from the congested condition of the tumour and of the surrounding parts during the crisis.

It is, therefore, the duty of the Surgeon, after examining the symptoms and determining his diagnosis, to effect a cure by the extraction of the tooth, and so remove those morbid phenomena which accompany a tumour of the dental periosteum, and whose continued presence may produce the serious results which we have pointed out in the course of this description.

PROCEEDINGS OF DENTAL SOCIETIES.

MEETING OF DENTISTS IN PARIS.

DENTAL REFORM is still making progress, and our brethren in France are beginning to see the necessity of following in the footsteps of the American and English Dentists. The last number of the 'Revue Odontotechnique' gives the following account of what is now doing in France for the elevation and promotion of the Dental Profession in that country :—

On Monday evening, May 21st, a meeting of Dentists took place in Paris to consider the subject of Dental Education in France. Several interesting matters were discussed, and amongst others that of the old Society of Dentists, established in 1845, and whose objects were defeated by the events of 1848.

It was generally admitted that this Society had many difficulties to overcome, some of them arising from the want of unanimity amongst its members ; but, at the same time, there could be no question of the good it would have accomplished had it continued in existence. It had, therefore, been proposed that this Society should be reorganised, or, at all events, that the old members should be asked to take part in the present discussions for the formation of the new Society.

It was ultimately proposed that a new Society should be formed, whose governing body should consist exclusively of French Dentists.

During the meeting, a letter was read from Dr Evans, expressing regret at his unavoidable absence, and, at the same time, the interest he felt in the present movement, and his desire to promote the dignity and standing of the Dental Profession in France. With this view he offered to the Society the following prizes for original Essays, to be written by French Dentists, on the undermentioned subjects :—

1. For the best Essay on Diseases of the Mouth and their Treatment, to be accompanied by microscopic drawings and descriptions.

	Francs.
First prize - - - - - - -	500
Second prize - - - - - -	250

2. For the best Essay on the Treatment of Caries.

	Francs.
First prize - - - - - -	500
Second prize - - - - - -	250

3. For the best Essay on the Manufacture of Artificial Teeth.

	Francs.
First prize - - - - - -	500
Second prize - - - - - -	250

It was arranged that a meeting of Dentists should be called for the month of October. In the mean time, the following propositions have been put forward as a basis upon which to construct the new Society.

FIRST PROPOSITION:

To admit immediately all who may be practising as Dentists in France, whether with or without a Diploma; the first and principal condition being that such persons should practise their profession in an honourable manner.

That the Society, when established, shall use its influence to induce the Government to do the same for the teaching of Dental Science as it has already done for the teaching of Medicine and Surgery. That, at no very distant period, all who desire to practise as Dentists shall be admitted, either in the manner previously followed, or according to some new method to be instituted by the Government.

That Doctors in Medicine shall not be allowed to follow the Profession of Dentist without having gone through a special course of study, and after passing the prescribed examinations.

SECOND PROPOSITION:

Only to admit French Dentists qualified in France; or, if foreigners should be admitted, who are qualified according to the regulations adopted in their own country, that such persons shall not form part of the governing body.

The question of professional education seems less important to advocates of the present proposition, than to the supporters of the previous proposal, who consider it of the utmost importance. They would almost seem to ask the Government that all who practise Dentistry should be provided with the Diploma of Doctor of Medicine.

The Editor of the 'Revue Odontotechnique' requests all Dentists practising in France to forward to him their adhesion to one or other of these propositions.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

(From the 'Dental Cosmos' for May.)

A MONTHLY Meeting of this Association was held on the evening of April 10th, 1860, at eight o'clock.

Vice-President, Dr T. L. BUCKINGHAM, in the Chair.

Present, Drs Garretson, McQuillen, Peirce, Kingsbury, Woodward, Hopkins, Goodwillie, and Barker.

The subject of

"ABSORPTION OF THE FANGS OF DECIDUOUS TEETH,"

having been selected for discussion, was opened by Dr James E. Garretson, who remarked that he scarcely knew how to approach the subject, though it was one to which he had given a somewhat close consideration, for such study had only tended more and more to his confounding.

He felt that at this hour he knew decidedly less of the peculiarity of the process of absorption of the fangs of deciduous teeth than when, years ago, he read his first page on the subject.

He thought at the first glance, the process appeared very plain and simple, seeming to require only a comprehension of the general laws of absorption for its complete elucidation ; but a more close and patient investigation would prove such was not the case.

Gentlemen might run off excursively on lymphatic and venous absorption, liquefaction of tissue, molecular disintegration, and all the varied and wonderful phenomena of life-changes. They might, and no doubt would, offer in example the thymus gland, Wolffian bodies, etc., etc., but all would be found insufficient to explain the phenomena of absorption of the fangs of deciduous teeth. He meant by this the mode of change, and the agent or agents employed in the work.

It was not, as Professor Dunglison had suggested, an atrophy from pressure, because fangs are absorbed where no pressure exists. It could not be an action dependent on the vascularity of the periosteum, because there were cases lying on the table where absorption had progressed from within outward. It was not influenced, as contended by Dr McQuillen, by the perversion of the life-supply from the temporary to the developing permanent teeth, for he was familiar with cases in which absorption had occurred, and not even the germs of the permanent teeth existed.

It was not necessary to this process that a tooth should have a live pulp, as maintained at the last meeting, for he would present for consideration a tooth where absorption had taken place, exposing a view of gold-foil, with which the pulp cavity had been filled.

Mr Tomes, in his late work, gives us nothing new in his observations. The fossæ described by him is a microscopic observation made by many others, and is a stage in the process of liquefaction, without which no tissue is capable of the endosmotic change which removes it from the body ; in other words, that gentleman has given us only a phenomenon, not a cause.

The truth of this was evident from the specimens to which he alluded a moment back—that were lying on the table, where absorption had commenced from within and progressed outward.

Whether or not the absorption of this material was dependent on a lymphatic or venous proximity, he did not consider it particularly relevant to consider, but thought it might not be amiss to recall the fact that microscopy had as yet demonstrated no lymphatic glands or vessels in the tooth-pulp.

"A dead tissue must be removed by a living one ; it also needs no special cellular mass" (see Tomes), which cellular mass he would take occasion himself to examine under the microscope, asserting that it might not unlikely be lymph in a state of attempted organisation ; the condition of parts thus physiologically excited, would warrant such a supposition.

The unsettled question is, to the existence of what peculiar vessels was absorption of the fangs due ? What must be the condition of the neighbouring parts ; and was this absorption explainable by the laws of absorption in other parts, or had it phenomena peculiar to itself ?

He had no hypothesis of his own to offer, and felt at the present quite in the dark on the subject ; and said, in concluding, that he might not have opened the subject as members deemed it deserved from its importance ; but it did not seem advisable to enlarge on the subject of absorption in its general relations, knowing that all his fellow-members were quite as familiar with the matter, if indeed not more so than himself, and that so far as the local consideration of the evening was concerned, he admitted to them that he was far from satisfied with any of the explanations that had seemed to suggest to him, or had been advanced by others.

Dr McQuillen referred briefly to the views he had advanced at a preceding meeting, when an effort was made to account for this phenomenon, by referring it to the great law of compensation that prevails in the entire economy, *i. e.*, waste and supply. Thus we find when other portions of the organism are over-nourished, *hypertrophy* is the result ; and when the supply is not equal to the demand, *atrophy* supervenes : this was true alike of the muscular and other tissues, not even excepting the osseous.

Such being the invariable result, was it not fair to presume that the two conditions manifested in the numerous and interesting specimens of the absorption of the fangs of the deciduous teeth on the one hand, and of exostosis of the fangs of the permanent teeth on the other, which he had the honour of presenting to the notice of the members, was due to the operation of the same law and brought about by the same causes that induced hypertrophy or atrophy in other parts of the body.

No one certainly would assert that exostosis of the fangs of the permanent teeth was not due to *hypernutrition.* Why, then, may not the atrophied condition of the roots of deciduous teeth with equal propriety be attributed to *defective nutrition ?*

The inadequate supply of the materials inservient to the nutrition of the fangs of the deciduous teeth, he had endeavoured to account for by advancing the *supposition* (not making an *assertion*) that the demands made by the germ of the permanent successor below for its growth, deprived the blood sent to the deciduous tooth of the essential materials of nutrition. In addition to this, he thought that it was very possible that the pressure of the crown of the permanent tooth upon the capillary vessels of the pulp, or the periosteum of deciduous tooth, by retarding the flow of blood through them, and the influence of the nerves in nutrition, had much to do with it.

With regard to the absorption of hard tissues, such as bone and dentine, in the present advanced state of physiological science, he did not understand how any one could talk about one tissue breaking down another. Every tissue in the body has within itself the elements of life and of destruction. Cell by cell, each tissue is formed ; cell by cell, a constant disintegration and renovation is going on, and this constitutes nutrition. Thus the tissues of the deciduous teeth were formed, thus at least two of them (the dentine and cementum) are removed ; no acid, spongy mass, or cancerous body are required to break down bone or dentine, molecular disintegration is all-sufficient. In the function of nutrition the blood-vessels can only be looked upon as the conduits or carriers of nutrient materials to, and waste matter from the tissues. By cell action the pabulum of the blood becomes part and parcel of the tissue, by disintegration of these cells the effete matter is again given up, either to the veins or lymphatics. Neither of which can be regarded in any other light than as capable of removing that which has already assumed a fluid condition.

Dr **Woodward** said, that without presuming to any special knowledge of this particular form of absorption, he could see no difficulties in the way of comprehending that it did not apply with equal force to every instance of retrograde metamorphosis in all of the tissues or organs of the body. Special instances had been brought forward by gentlemen, such as the Wolffian bodies and the thymus gland ; but what was true of these was true of other tissues, as instanced strikingly by the mammary gland of the female. In this last case, the involution did not appear directly sequent to diminished nutritive supply, for the menstrual flow having ceased, there was generally abundant nutritive material present, as evidenced by adipose development ; which, however, did not always occur, and therefore could stand in no casual relation to the mammary atrophy.

In fact, retrograde metamorphosis, which was only another name for atrophy, was normal for every living creature, and for every organ which had reached the full period of life. Even the muscles, often quoted as permanent, fall into a state of involution toward the decline of life.

It could then be stated as a general law, that every organ has within certain limits its period of evolution and involution, the one succeeding naturally to the other. Sometimes these phases in the life of the individual organ coincided with the evolution and decay of the whole organism ; sometimes they were far more brief, and then, as involution occurred, the involved texture was either absorbed or thrown off from the surface, as the case might be ; thus, for example, in the instance under consideration, the root was absorbed, the crown thrown off. It was, then, by the general law of retrograde metamorphosis that he would explain the absorption of deciduous fangs.

It might be objected that this reference of the process to a general law did not explain it, and, in fact, one of the gentlemen had remarked that it was one of the inexplicable processes of nature. He would submit, however, that all the simple facts of nature were inexplicable, and could not be accounted for ; and that to explain a complex fact, meant no more than to refer it to the simple facts of which it was composed. Thus the complex motions of the heavenly bodies were *explained* by showing that they were all so many manifestations of the law of gravity, but the *cause* or reason for gravitation could not be made clear.

Dr **Barker** objected to the position assumed by the preceding gentleman, that to *retrograde metamorphosis* alone was the absorption of fangs due. His reason for this objection was, that it was not uncommon to see deciduous teeth remaining in the mouth until a very late period in life, and accomplishing the same work as the permanent teeth.

He had filled, but a short time since, a deciduous tooth for a patient at least forty years of age, and had seen many other instances of deciduous teeth supplying the place of the permanent ones.

The theory that to the universal law of waste and supply must we look for a solution of this phenomenon, seemed to him a true position, particularly so when to it was added the fact of impeded circulation by pressure from the growing permanent teeth.

The position had been advanced by a preceding gentleman, that "the deciduous teeth might be compared to the fall of the leaf, for in both the life-forces were exhausted ;" he admitted the truth of this, but would apply it in a different manner : as to him the same law of waste and supply here held good, the sap being withdrawn from the leaf, nutrition could not progress, and cell disintegration was the result.

It had been assumed that deciduous fangs might be and were absorbed when no permanent teeth or germs were present ; this might be so. (But in a recent conversation with Drs J. F. B. Flagg, Danl. Neall, and J. Foster Flagg, gentlemen whose extended experience, particularly in the treatment of deciduous teeth, entitled their opinion to great weight, he was assured that they had yet to meet with the first instance of absorption of the fangs of deciduous where no permanent teeth or germs were present, or did not at some future time make their appearance.)

Dr McQuillen had never heard of or met with in his own practice an instance in which a deciduous tooth was loose and the fangs absorbed, without finding the permanent tooth ready to erupt or coming through soon after the removal. He would ask the other gentlemen present what *their experience* had been with regard to this matter ? He did not wish to be informed of what patients had said, for such testimony must be regarded as valueless. Every practitioner has had sufficient experience to recognise how unreliable the statements of patients are. To account for the removal of the deciduous teeth upon the ground that they have a definite period of existence, and that whether the permanent teeth make their appearance or not, they will loosen and fall out, was the reverse of his experience. On the contrary, he had met with *many* cases (and referred to them on former occasions) where deciduous teeth had remained in the mouth long after the usual period of shedding. In one instance had removed the nerve from and filled the fangs of a left superior *deciduous* canine in the mouth of a gentleman thirty-five years of age. Again he would take the liberty of referring also to a fellow-practitioner, Dr A. Westcott, who has a left superior deciduous canine which is as firm in the alveolus as any permanent tooth in his mouth.

He *knew* of several instances in which deciduous teeth that were firm in their sockets had been removed, as it was supposed that by their presence they prevented the growth of the permanent organs, and that after the operation the expected successors had failed to make their appearance. Regarding this a matter of vital importance, he thought it should be adopted as an axiom on the part of the Profession *that a deciduous tooth, unless radically affected by decay, should never be removed until there are unmistakeable evidences of the presence of a permanent tooth to succeed it.*

Of hypertrophy in connection with inflammation, it was a well-attested fact that the hair in the neighbourhood of an ulcer was found to grow more profusely than in distant parts of the integuments that are less liberally supplied with blood ; and that in cases of circumscribed necrosis of small portions of bone, the adjacent soft parts being rendered mere vascular thereby, hypertrophy of the surrounding bone was frequently induced.*

Dr Buckingham remarked that all organs have certain functions to perform and a limited time to exist. Why some organs are lost so early in life, is not easily accounted for, nor is it giving a satisfactory explanation to attribute their loss to a law of nature.

He thought it was our duty to study these laws, and endeavour, as far as possible, to find out the operations of them ; not that we shall ever be able to understand the first cause, but we may arrange the phenomena in classes so that we may be able to explain most of them to a certain extent.

Nearly all the phenomena of gravitation had been observed from the earliest times, but it remained for Newton to attribute them to one great cause ; and although he could not explain the force of gravitation any more than the ancients could, he arranged the phenomena so that many of them are now much more satisfactorily accounted for than they were formerly.

Every living thing has a limited period of existence, though there is nothing connected with it by which we can tell how long that period may be. We may know how long others of the same class have lived, and by this judge how long it will live ; but if we were to undertake to investigate its structure in order to find out how long it would live, we would soon find we had undertaken a difficult operation. The cells that compose the tissues of an animal that lives but a few months are exactly similar in appearance to those which form the structure of one that lives a century—no physiologist can tell any difference between them, still there is a difference. As different animals have a limited period of existence, so the organs of which they are composed have their own time to develop, grow, and die. Some of them cease to perform their offices after birth ; others grow and are used for a short period, and are then replaced by more permanent ones ; and others, after they have fulfilled their purposes, are removed so effectually that scarcely a trace is left of them.

The temporary teeth having existed their period of time, and performed their duties, are shed and replaced by more permanent ones ; how their roots are absorbed is not well understood—in fact, we know very little of the process by which they are removed. It has been attributed to atrophy or want of nourishment. He would ask why should they become atrophied at this time of life, in healthy children, when the supply of nourishment to the parts was as great, if not greater, than it had been at any time previous ? This is evident from the surrounding tissues being in an excited condition during the time they are absorbed.

That it is not caused by pressure from the permanent teeth, is evident from the fact that there is a bony partition between them. We would suppose that if pressure caused the absorption, the bone would be absorbed first. But the roots of temporary teeth are sometimes absorbed when there are no permanent ones to take their places. Absorption in these cases cannot be caused by pressure.

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* Dr J. Foster Flagg, at a former meeting of the Association, read an excellent paper on exostosis of the fangs of the permanent teeth, in which he cited, as one of the causes of that condition, alveolar abscess. As the position appeared untenable, we took exceptions to it. Having been convinced that his view on that point is correct, we feel bound and take pleasure in making the acknowledgment here, as the transactions of that meeting were published.- Ed. Dental Cosmos.

It has been observed, for a long time, that immediately under the parts absorbed there is a new tissue formed. It was supposed at one time, that this tissue threw out an acrid fluid that dissolved the roots of the teeth ; and although we do not admit now that an acrid fluid is present, still it is supposed this tissue has something to do with the absorption of the fangs ; but whether it causes the absorption, or merely fills up the cavity which would be formed by the root being absorbed, he was not able to determine. He thought it received the substance of which the fang was composed, and carried it into the circulation.

He had no doubt but if we took the other meaning of atrophy, we would have the true explanation for the cause of absorption—" a consumption or wasting without any sensible cause." The cells having lived out their period of time, lose their vital powers, degenerate, are broken up, dissolved, and carried into the general circulation. The process is the reverse of that by which they were first formed, the earthy matter passing away first.

Dr **Woodward** said, in answer to Dr Buckingham's question, " What distinction can be drawn between the enlargement of parts produced by inflammation, and hypertrophy ?" that a few years ago he would have answered the question promptly and to his own satisfaction. He would have said, with Rokitansky and a host of others, that true hypertrophy was an increased size of any part resulting from increased nutritive activity without the production of new-formed elements. That in true hypertrophy, the minute elements of the part increased in size, or multiplied by division so as to increase in number. That in inflammatory enlargements, lymph was effused, and new-formed cells arose in the blastema thus afforded, by free cell development. That such enlargements should, therefore, be referred to the category of false hypertrophies, the increase in size being due to the presence of new-formed and abnormal elements.

Since the publication of Virchow's 'Cellular Pathology,' it was, however, impossible for him to present dogmatically the above statement ; and although he was far from prepared to adopt at once all the views of that most ingenious and laborious investigator, he could not wholly ignore them in replying to the interrogations of Dr Buckingham.

If Vichrow be right in the main, if the doctrine of free cell development is to be rejected, if the dogma " omne cellulæ cellula " hold good, if the pus-lymph and cancer-cell, in common with the cells of all abnormal growths, result in fact from the multiplication by division of cells normally existing in the part affected, it will be seen at once that the theoretical boundary line between hypertrophy and inflammation is broken down, and that our most fundamental notions on these points must be reconsidered.

Dr **Peirce** said, in discussing the absorption of the fangs of deciduous teeth, it may not be out of place to glance at the condition of the patient at the time of their development, also the purpose they are intended to subserve. Dental development, commencing as it does early in intra-uterine life, steadily progresses from that period until some time in infancy. The teeth, unlike the other organs of the body, are perfected and grow no more, becoming at that early age " efficient organs of mastication and articulation." This state they retain until, with the lapse of time, the jaws increase in size, and *stronger organs of mastication* become *necessary*.

This fact being patent, the query naturally arises, by what process are they removed in order that they may be replaced by more durable substitutes ?

But before entering further upon this he would allude to another fact, that the tissues in infancy are less firm and durable than later in life ; also, that the changes which take place at that period, either in absorption, reproduction, or growth, are more rapid ; hence a little light upon the speedy destruction that we have in many instances of the fangs of deciduous teeth.

He thought all were of the opinion that this necessary change takes place in obedience to a law in the animal economy, the result of which is the removal of such tissues as have served the purpose for which they were intended, giving place to those better qualified to supply the wants of the animal in a later period of existence. But this explanation does not solve the query ; the fact that it takes place in accordance with a law does not tell how it is done, and hence it is not satisfactory.

Whether the absorption is, as Dr McQuillen has suggested, the result of a transfer of nutrition, and a refusal on the part of nature to support useless organs, and hence a natural breaking-down from this cause, or the consequence of the presence of a tissue secreting some fluid directly effecting its destruction, is an unsettled question. That there is a vascular tissue lying directly in contact with the absorbing fang, there can be no doubt ; but that this tissue is instrumental in the manner alluded to above, is not certain. It may simply be fulfilling the law against a vacuum, and hence only a thickening of the membrane to occupy the space left by the destruction of the fang ; or it may, as Dr McQuillen suggests, be the pulp in a condition similar to it, previous to calcification.

The evidence in favour of the former theory (a transfer of nutrition) is strengthened by the fact, that in by far the larger proportion of instances the presence of the permanent tooth is essential to the absorption of the deciduous fang ; for when that is not in progress of development, the deciduous fang remains unabsorbed, and, as far as it can, the crown supplies the deficiency. In confirmation of this, I could refer gentlemen to a number of patients who have reached their twenty-fifth year, and are now using to advantage deciduous teeth preserved with gold fillings. Also two aged twenty-three and twenty-five, each of whom have a deciduous superior cuspidatus, with nerve destroyed and fang filled with gold, doing excellent service.

That the above rule respecting absorption is universal, I am not prepared to affirm, for I have extracted two deciduous crowns, with fangs absorbed, without the gums or alveolar ridge giving any evidence of the presence of a permanent tooth, and, judging from age of patient, should think the germs were undeveloped. But even in these I cannot say they would never, or have not been replaced, for I have not since seen the patient.

In reference to the progress of absorption, some thirty specimens of deciduous teeth which he had collected, representing the progress of absorption in all its various degrees, prove—First, that absorption commences externally and advances internally ; secondly, that in the progress of absorption the tissue highest in the scale of organisation is the last to be broken down ; and thirdly, that a dead or necrosed tooth will not be absorbed, but nature makes the effort to remove it by suppuration, by throwing it in a mass from its socket, or by absorption or sloughing and exfoliation of the surrounding alveolus and gum. These facts bring us to other reflections—such as the propriety of destroying nerves of deciduous teeth, etc. ; but he would not occupy more time than to put on record his firm conviction, that of the two evils, viz., premature extraction of the deciduous teeth, or non-absorption of their fangs, he should much prefer the latter.

Dr **Garretson** said the whole or a portion of the fangs may be removed by an atrophy, the result of pressure on the parts by the advancing permanent teeth, and remarked that he would denominate this species of removal an atrophy. He would thus draw a line between fangs disappearing from pressure, and their disappearance where no such cause existed. Such disappearance of fangs seemed to him pathological rather than physiological, inasmuch as it was caused by a mechanical interference with its function. The parts were removed precisely as parts disappear before an advancing scirrhus.

He did not wish to be understood as drawing any line between atrophy and absorption : he made this division merely for a present convenience in explanation. But fangs were taken away, disappearing gradually from apex to base, where no pressure existed from the beginning to the completion of the process. He remarked that, as pressure was not then the rule, it could not be the exciting cause of absorption.

Gentlemen had advanced the view, that the deciduous tooth, having lived the allotted period, dies through a natural law. This was all very well; but, unfortunately, a great many deciduous teeth belied the assertion by never absorbing, remaining in the mouth until surgically removed.

Such data offered nothing in explanation of the rule sought after. Where there is no certain rule, action is chance. Nature never leaves her work in this way ; she has rules for all she does. If such cases were called anomalies, he would reply they were of entirely too frequent occurrence to be called any such thing.

As, then, it is seen, by an understanding of the visible condition of this fang absorption, that it follows no rule which governs the laws of general absorption, and as everything in nature with which we have familiarity proves the existence of law and design, it does seem to prove that the explanation sought evades us, because we are yet ignorant of the true law through which absorption is influenced.

Dr **McQuillen** said, Mr President, I arise to offer a motion, which, after listening to the lucid and interesting remarks of Dr Woodward, cannot but meet with a hearty response on the part of the members present. It is as follows :

Resolved, That a vote of thanks be tendered by this Association to Dr Woodward for the able and instructive views advanced by him this evening.

Seconded by Dr **Barker**, and adopted unanimously.

COLLEGE OF DENTISTS OF ENGLAND.

CONVERSAZIONE.—JUNE 19.

On Tuesday evening, June 19th, the fourth and concluding Conversazione of the present session was held at the rooms of the College, when a large number of members and visitors were present. On this occasion the President, Mr Waite, delivered an address on the recent proceedings of the College, and their bearing on the future prospects of the Dental Profession. He observed that sufficient had been said on former occasions as to the origin and objects of the College. The principle of independence on which it is based had greatly contributed to its success, and the Council felt that it was only necessary to persevere in the same course in order to attain the highest success.

The Executive of the College had this year gratification in carrying out the educational objects contemplated at its formation. The success of the Metropolitan School of Dental Science had been complete. The Professors had been unwearying in their exertions, and the information gained by the students during the session had been such as years only would have secured them before the formation of the College. Abroad little had occurred which required to be noticed. The American Colleges had continued to prosper, and the impulse which they have given to the progress of Dental Science in that country was steadily maintained. In France, signs of organisation were seen in the Dental Profession; he trusted that a salutary lesson would be learned from the recent proceedings in this country, and that everything which was likely to lead to disunion would be entirely avoided. He had much pleasure in calling to their remembrance the success of their last meeting, and of the kindness of Mr John Brady, who had distributed the prizes and medals awarded by the Council of the College and the Lecturers of the Metropolitan School of Dental Science. Not the least encouraging part of the first session was the number of students who had entered to the various lectures, and the diligent manner in which they had attended. Mr Brady had evinced the most heartfelt interest in the success of the College, and promised his support on all future occasions to promote its further progress.

He regretted that, a few months since, a Protest had been issued against the proceedings of this College. A Counter-protest was considered necessary, which had been numerously signed. The Medical Profession also evinced their sympathies with the College of Dentists; and it will be long remembered that the number of nearly 3,000 Medical men eminent in their profession were enlisted in the cause of the College of Dentists, and expressing their determination to support it. While he deplored the existence of disunion, he felt sure the day would come when Dentists would disunite themselves from the College of Surgeons; and, as rivalry will have called forth the energies of the contending parties, a mutual respect would arise, and the progress of science and the interests of society would be materially advanced. Whatever might occur, the Council was fully determined to persevere and to devote all its energies to the general good of the Profession, feeling assured its members would ultimately acknowledge the justice of its views and the assiduity with which it had watched over their interests.

The Council were justly entitled to the thanks of the Members for obtaining Mr Erichsen's consent to deliver his Surgical Course of Lectures. While each lecture was full of interest, he would more particularly remind them of his explanation of the distinguishing difference between cancerous and inflammatory diseases; of his observations on neuralgia and simple toothache, the remedies he advised locally and constitutionally, and the advice he tendered, in recommending that on all occasions diseased roots of teeth should be removed judiciously from the mouths of persons of an irritable diathesis.

To Mr Hulme, a member of the Council, best thanks were justly due for the able manner in which he elucidated the various and latest theories connected with the structure and development of the teeth.

Dr Richardson's Lectures on Anæsthesia and Anæsthetics had elicited the most lively interest. Those gentlemen who had witnessed the experiments of his last lecture would thoroughly understand the dangers of chloroform. They would do well to resort to its use for the extraction of teeth as seldom as possible. The responsibility of extracting difficult and dangerous teeth is always onerous, and no one should give anæsthetics but those who have made it their special study, and who can stem the torrent of public opinion when untoward death follows its administration.

In addressing the junior members of the Profession, and more particularly those students of the school who were present, he feelingly and forcibly reminded them that the corporeal structures which they so carefully studied had something spiritual connected with them: that with this spirit which had flown away was a mind which constituted the living principle; that it was endowed with emotions and sensations; that it derived strength and energies from the sanitary condition of the body; that it was influenced by hereditary tendencies, weakened by vices, intermarriages, and wrong admixture of blood, demanding, in a public point of view, highest attention on account of the disasters which follow these deteriorating and injurious influences.

Mr Waite concluded by observing that amongst the philosophers who have shone in this country, those connected with the Medical Profession held a prominent position. Various types of disease of mind as of body had called forth special labours, and the Medical Profession owed the exalted position it now occupied:

a position he fervently trusted it would never lose. Still, amidst the glorious reminiscences with which it was encircled, the progress of this College, as a foremost protector of specialities, was watched with undeniable interest.

In furthering, therefore, the task which the College had undertaken, he firmly relied on the co-operation of the Dental Profession. If the Medical Profession is still to raise its position, this will only be accomplished by allotting to its members their appointed tasks, and thereby securing to the public men well versed in their separate departments or specialities—men who are willing to unite their best efforts towards the greatness of their country in its travel down the stream of prosperity, which, although occasionally ruffled by adverse tempests, will still glide on in the annals of time greater and greater in its eventful records.

The above is a brief abstract of the President's address, which was listened to with marked attention. At its conclusion, the thanks of the meeting were unanimously awarded to the President for the kind and able manner in which he had conducted the proceedings of the session.

The walls of the room were decorated with a numerous series of diagrams illustrating the anatomy of the mouth and jaws, and the microscopic structure of the teeth throughout the various classes and families of the vertebrated animals. Sections of these teeth were also shown by a number of first-class microscopes, which were provided by Messrs Ladd and Pillischer, to whom the Society is indebted for their kind and liberal assistance. Some beautifully-executed water-colour drawings were kindly lent by Mr Whymper, jun., and were much admired.

Dr Dewar's self-packing apparatus for vulcanite was exhibited and explained by Mr Paine, of Great Russell street; also an improved blow-pipe, the invention of the latter gentleman.

Messrs Ash sent specimens of their gum-coloured vulcanite, and an improved flask for vulcanising, a description of which will be found at another page. The colour of the vulcanite is a great improvement over any other which has hitherto been manufactured, and harmonises much more closely with the general tone of colour belonging to the natural gum.

Some specimens of mineral teeth sent by Messrs Lemale were universally admired. The vulcaniser sent by Messrs Rickets and Hammond is another ingenious modification of the various apparatus now in use for that purpose, and deserves the attention of the Profession.

Mr Chapman, of Frith street, Soho, exhibited a new form of operating chair, and Messrs Taylor, Pratt, and Collins some excellent specimens of mineral teeth, materials for taking impressions, and several improved patterns of scaling, stopping, and extracting instruments.

The other contributors on this occasion were Dr Purland, Messrs Hulme, Robinson Kempton, Pillin, and Hockley.

COLLEGE OF DENTISTS OF ENGL

The following gentlemen have received the Certificat of this College :

Alabone, Alfred, Newport, Isle of Wight.
Allshorn, George Edward, M.R.C.S., Edinburgh.
Allshorn, William Charles, Edinburgh.
Atkinson, James Henry, Leeds.
Bellaby, Goodman Wood, Nottingham.
Bevers, Edwin, Oxford.
Boulger, P., Norwich.
Brenneis, Daniel J., Cavendish square.
Campbell, Walter, Dundee.
Carter, Edwin, Barnsley, Yorkshire.
Chapman, William, Maddox street, Regent street.
Finzi, Samuel Leon, City road.
Fothergill, Alexander, Darlington.
Fothergill, William, Darlington.
Fowler, Charles Jevons, Gloucester (by Examination, April 26).
Franklin, George Paul, Bayswater.
Garratt, P. L., Douglas, Isle of Man.
Garnett, Henry Joseph, Sheffield.
Grant, William, Inverness.
Harding, Thomas Henry, Park square, Regent's park.
Harley, James, Davies street, Berkeley square.
Hankins, Thomas, Mornington crescent (by Examination, April 26).
Harrington, George Fellows, Ryde, Isle of Wight.
Hayman, John Griffin, Bristol.
Hayman, Samuel Augustin, Bristol.
Henry, George, Jun., Wimpole street, Cavendish square.
Hockley, Anthony, Princes street, Hanover square (by Examination, May 31).
Hopkinson, William, Salford.
Horne, James, Glasgow.
Hughes, James Austin, Birkenhead.
Hulme, Robert T., M.R.C.S., F.L.S., John street, Bedford row.
Imrie, William, Savile row, St James's.
Kelly, Thomas Mark, Manchester.
Kempton, Henry T., Princes street, Hanover square (by Examination, April 26).
King, Norman, Exeter.
Little, Stephen, Bristol.
Lloyd, George Fieldhouse, Leicester.
Margetson, William, Dewsbury, Yorkshire.
Mackintosh, James, Edinburgh.
Mackintosh, Richard Cobden, Edinburgh.
Mackintosh, William, Dublin.
Merryweather, James, M.R.C.S., Brook street, Grosvenor square.
Morrison, James Darsie, F.R.S.S.A., Edinburgh.
Moseley, Simeon, Hull.
Moseley, Benjamin Lewin, Hull.
Neep, Edward, Norwich.
Nightingale, Daniel Thomas, Newcastle-upon-Tyne.
Patrick, Robert, Bolton.
Pearce, William, New Town, Bristol.
Penney, James, Lincoln.
Perkins, Henry J., City road.
Perkins, William, Maida hill (by Examination, May 31).
Pilling, Robert Campbell, Blackburn.

Porter, William Pratt, Finsbury place South, Finsbury square (by Examination, May 31).
Purland, Theodosius, M.A., Ph.D., Mortimer street, Cavendish square.
Robinson, James, Gower street, Bedford square.
Rose, James Edward, Liverpool.
Rymer, Samuel Lee, North End, Croydon (by Examination, May 31).
Sayles, Francis A., Lincoln.
Scholefield, James, Huddersfield.
Shortt, John, M.D., F.L.S., Madras Army.
Smale, Henry, Great Marlborough street.
Smith, John Cox, Maidstone.
Spencer, Harry Lyus, Orchard street, Portman square.
Stokes, Henry Colin, Newcastle-on-Tyne.
Sutcliffe, James, Bradford, Yorkshire.
Thomson, Robert, Denmark hill, Camberwell.
Tibbs, Somerset, Cheltenham.
Vernon, William Francis, Edinburgh.
Vidler, Thomas Collins, Eastbourne terrace, Hyde park (by Examination, April 26).
Waite, George, M.R.C.S., Old Burlington street, St James's.
Weaver, George, Upper Baker st., Regent's park (by Examination, May 31).
Weiss, Felix, Great Russell street, Bloomsbury (by Examination, May 31).
West, Byatt, M.O.S., Old Broad street, City.
West, John T. H., Old Broad street, City.
Williams, Edwin, Malvern, Worcestershire.
Williams, George Joseph, Ladbroke road, Notting hill (by Examination, April 26).
Winterbottom, Edwin John, Sloane street, Chelsea.
Winterbottom, Edwin John, Jun., Sloane street, Chelsea.
Wood, William Robert, Brighton (by Examination, April 26).

NOTICES TO CORRESPONDENTS.

We have been requested by the Secretary of the College of Dentists to state that the third and final List of Members of the Medical Profession who are in favour of an Independent Institution for Dentists will be published next month. Those Members of the College of Dentists who have kindly promised to procure signatures are requested to communicate with the Secretary without further delay.

Mr Hulme's Lectures on "the Structure and Development of the Teeth" will be continued in our next.

BOOKS RECEIVED.

Dental Register of the West for June (in exchange).
New York Journal of Medicine for January and March (in exchange).
American Medical Times (in exchange).
The London Medical Review (in exchange).
Revue Odontotechnique for June, Paris (in exchange).

THE

DENTAL REVIEW.

AUGUST, 1860.

ANÆSTHESIA IN DENTAL SURGERY.

It is to us a refreshing task to turn for once from those important political but painful topics to which we have been of late inevitably drawn, to consider any question bearing on the advancement of science and the interests of humanity at large. A period of quietude, such as has not occurred for a long time past, affords the occasion for a diversion; and as the opportunity opens, a variety of subjects, each of equal interest, press forward for notice. Let us take up the first that comes to hand: the value of anæsthesia in dental operations.

A lately-received number of the 'Dental Cosmos' (for June 1860) contains the report of a discussion on this point before the "Pennsylvania Association of Dental Surgeons." The report teaches the curious fact, that in America, where anæsthetics were first applied for the removal of pain incident to operations, and where they were also first used by Members of the Dental Profession, there, and amongst the Members of the Dental Profession themselves, the employment of anæsthetics is first beginning to fall into disfavour. Thus, in the report to which we refer, we find almost every speaker objecting to the use of chloroform, and offering a most decided preference to sulphuric ether as an anæsthetic, while a majority condemned both.

Dr McQuillen, for instance, prefaces his remarks by observing "that he does not employ anæsthetic agents in his practice; and the reason he gives for this course is, that in using ether, it (the ether) contaminates the atmosphere of the operating-room to an extent that makes it disagreeable alike to patients and to himself: and, he adds, as several of his friends in whose judgment and discretion he has every confidence are in the habit of administering it, and like to do so, he sends patients desiring to be etherised to them. In like manner, Dr Townsend bears testimony that although he employs anæsthetics, he does not do so as he did previously, but is discouraging as much as possible his patients from using anæsthetics, thinking that for the operations he is called upon to perform the anæsthetics are unnecessary.

In a word, the tone pervading this report—a tone which is now, we believe, but a reflection of the general feeling of Dentists in the United States—is against the use of chloroform altogether, and against what is considered the safer agent, *ether*, in as many cases as possible. Excepting always that in this country chloroform still holds a decided supremacy over ether, we believe that a similar discouragement of the employment of general anæsthetic agents is becoming slowly but increasingly developed: we are retiring, *i. e.*, to the old system of cheering the patient, and of hardening ourselves in the belief that safe temporary suffering is preferable to painlessness with danger.

It is not difficult to trace out the reasons for this great change of sentiment and of practice which has passed over us. The novelty of anæsthesia, in which many of its disadvantages were for a season buried, has cleared away. As sulphuric ether has come into use in Dental Surgery, the annoyances incident to its administration have been brought out. Its inhalation has proved an annoyance to the operator: it has been in many cases imperfect in its results, while it has always been found an expensive and time-destroying process. Chloroform, again, while it is most readily applicable, while it is always successful in destroying pain when administered efficiently, and while it offers no personal inconvenience to the operator, has undeniably proved itself so dangerous, that few of us care to call it into action unless the responsibility of administration be placed on the shoulders of a professed and skilful administrator.

The important question, then, that offers itself to our contemplation is, whether we are justified in using general anæsthesia at all in dental operations; and if so, whether we are justified in using them in *all* operations, or in some only, and under particular circumstances?

Our experience on these points leads us to think that, as a general rule, the Dentist should never enforce the use of an anæsthetic on his patient, and should be chary even in suggesting it. We dwell on this view, not because we have any doubt as to the value of anæsthesia or any superstitious prejudice in regard to it, but because, as it seems to us, the dangers that are to be feared from the inhalation of narcotic vapours, obscure to all, are hidden from us, as a Profession, in double obscurity. We infer, from all the evidence that we can collect, that the danger to life caused in certain cases by anæsthetic substances lies not so much in impurity as in the mode of administration, and, above all, in the condition of the patient prior to the administration. Whenever there is disease of the lungs, especially tubercle; whenever there is structural disease of the heart, or structural disease of the kidney; or disease, obscure perchance in its manifestations but still present, in the brain or other of the nervous centres;—whenever any of these conditions are existent, then is the administration of a narcotic dangerous, even in skilled hands. Now, as it is not in the nature of things for one man to know every practical definition of this kind,—as it is impossible for the Dentist, confined as he is for the whole of the working hours of his life to the consulting-room and the laboratory, to make himself,—and not only to make himself, but to keep himself, master of all the details of physical and clinical inquiry requisite for the determination of the diseased conditions which we have described above;—as this, we repeat, is impossible, so we opine that on his own responsibility the Dental Surgeon should never undertake the charge of a process which is not in his true sphere, and which, performed ignorantly, may inflict irrecoverable mischief—*fatal* mischief.

It is not to the experienced Members of the Profession that we address these admonitions. They will feel that in what we have said we but re-echo their own well-digested and matured opinions. We speak rather to those who, entering the Professional life, and seeing how easy an act it is to render human bodies insensible to physical pain, but not foreseeing the consequences of the act in all their bearings, may be inclined to ignore the more accurate judgment of their compeers, and to undertake duties the performance of which may some day, and any day, embitter with sad regrets the whole of their lives.

The only objection that can be held against the course which we have suggested as the right course is, that the public may find fault with our timidity. We discard the notion. Patients have too much regard for their own lives to find fault with the Practitioner who, in his advice and conduct, shows himself anxious to avoid even the chance of danger. Our patients in this matter are not the judges, but the sufferers: if they assume the position of judges, they must take the consequences, but not on our suggestion nor from our hands. While we thus would discourage the use of general anæsthetics in ordinary Dental practice, we would, nevertheless, recommend with equal force the study on the part of our Profession of new and improved means for the production of *local* anæsthesia. That perfect local anæsthesia is producible, we know well. That the possible means for producing this local insensibility are not immediately practical, we know also well. Towards improvement, then, in this direction let our studies tend, and making this beneficient labour our special care, let us leave the production of general anæsthesia, with its dangers and responsibilities, to those of our Medical brethren who like the occupation, and are fitted for it.

DENTAL SURGERY AND MECHANICS.

A NEW BASE FOR ARTIFICIAL TEETH.

THE present may well be called an age of experiment, invention, and improvement, when the wonders of to-day are superseded by the novelties of to-morrow, and that which at one time was declared to have arrived at perfection must give place to an even more perfect arrangement.

The Profession has been revolutionised by the introduction of the hardened india-rubber base, and vulcanite has now become a household word. The dental depôts abound in novelties—vulcanite teeth of all patterns, shapes, and sizes—vulcanizers and vulcanizing flasks have variously commanded attention. The war set in with steam patents, dry patents, and superheated patents; every hour brought its novelty, until the Profession, surfeited with vulcanite in all colours, and tired of the many improvements flooded in upon them, awoke from its trance to cry, "Hold! I'll hear no more."

Vulcanite was not, however, entirely to take the place of gold, although it might of bone—vulcanite was *not* applicable in every case, and was *not* to be the ruin of the Profession. Highly valuable as an auxiliary, an auxiliary alone it must remain.

No sooner has this fever somewhat abated than a new rival appears unexpectedly upon the scene. On the 4th of May last, Letters Patent were sealed to John Macintosh for "Improvements in Setting Artificial Teeth," and thus runs the Specification:

> "This invention has for its object improvements in setting artificial teeth. For this purpose I employ COLLODION (or a solution of gun-cotton or fibre in a solvent); this material I apply to the teeth to be set when in a fluid or soft state, so that, when it hardens, the teeth may become securely imbedded in it. A form or mould is by preference employed to bring the mass of collodion in which the teeth are set to the proper form to fit the mouth. Cotton or other fibre may be imbedded in the collodion to increase its toughness, and the outer surface or the whole of the collodion may be coloured to look like the natural gum."

We will not at present attempt anything like criticism of these so-called "improvements," but simply give, in the words of the inventor, some particulars of the process. A model of the mouth is taken in the usual way, and a facsimile of the piece to be produced moulded in wax with the teeth imbedded in it as in the vulcanite. The collodion is prepared in the usual way, and in order to increase its toughness is mixed with a quantity of "short cotton fibre," and then evaporated until the collodion is brought to a "plastic and putty-like state."

"If it be desired to obtain a hard setting, I add to the collodion and thoroughly incorporate with it powdered gum copal, in quantity varying according to the hardness desired ; if great hardness is required, I employ as much as 20 per cent. The collodion whilst still warm I carefully press into the mould around the teeth, as in filling a mould with the compound of india-rubber and sulphur in making teeth of vulcanite, as is well understood ; I then place the two parts of the mould together, and force them together by means of the screw with which the box containing them is fitted ; thus the collodion between the two parts of the mould is forced into every crevice of it ; and in order that the collodion may remain thoroughly plastic, the mould is kept heated to about 200° Fahrenheit ; when the two parts of the mould are pressed close together the mould is allowed to cool, and when cool, the teeth with the setting, which is then complete, are removed."

The collodion is coloured to resemble gum by means of alkanet root, and may be coloured throughout or only with a gum surface.

"If it be desired to obtain a plate or thin flexible setting, I proceed in a similar manner to that already described, but I produce the two forms of which the mould consists in a readily fusible metal (a mixture of tin and lead answers well) in place of in plaster as before described ; but in this case, after producing the wax model the teeth are not left in it whilst the plaster cast is taken, but are first carefully removed. The collodion is formed into a sheet of the desired thickness, and there is cut from this sheet, with the assistance of a template previously prepared by measuring from the mould, a piece of suitable form to produce the setting. I then lay the piece of sheet collodion, previously rendered plastic by heat, in its place in one half of the mould, and the other half is then put over the first, and pressed firmly down upon it by the use of a screw box, as before explained. The mould is heated to about 200° Fahrenheit, so as to keep the collodion perfectly plastic, and the pressure applied is sufficient to force the collodion into every crevice of the mould. When the mould is cold and the collodion is set, the collodion plate is removed. The teeth are afterwards fitted in their places on the plate, and are fixed either by metal pins, or, as is preferred, the teeth are, as before mentioned, made with a passage up the centre, which is filled with collodion, and afterwards the collodion in the tooth and the plate at the part where the tooth is to be fixed are both moistened with ether, and they are pressed in contact till the solvent evaporates, when they will be found firmly attached the one to the other.

Collodion may also be employed for setting in the same manner as sea-horse tooth is employed, and as is well understood by dentists. In this case a block of collodion (mixed with fibre and copal if considered desirable) is formed and afterwards carved out to the form desired, the teeth being fitted and fixed as when sea-horse tooth is employed."

The advantages claimed for collodion, or a compound of collodion, as a setting for artificial teeth, are, first, that it does not decompose or become fœtid in the mouth; it is also free from metallic taste. Secondly, it is not liable to lacerate the gums; and from the natural flesh tint that can be given to it, it is not easily detected when in use. Thirdly, being specifically lighter than any substance at present employed, and a perfect non-conductor, it consequently can be used upon the most tender gums.

Although this compound has not been worn more than three months to prove its durability, the most careful experiments have been tried as to its non-absorbing qualities and indestructibility for the purpose of insulating telegraphic wires in lieu of gutta-percha and india-rubber, which are both absorbents.

To Mr Drew, of New Burlington street, have been entrusted the arrangements for carrying out the Patent, and it is expected that in a short time the material, with instructions to use it, will be placed before the Profession.

IMPROVEMENTS IN DENTAL INSTRUMENTS.—We have much pleasure to announce that the Council of the Society of Arts, upon the recommendation of the Committee on Surgical Instruments, have awarded the silver medal of the Society to Mr Robert Thomson, of Camberwell, for "several novel and ingenious instruments and tools for use in Dental Surgery." Mr Thomson has long been known in the Profession as the inventor of numerous useful contrivances for dental purposes, and for the extreme liberality and readiness with which he has placed his improvements at the disposal of the Profession. We heartily congratulate Mr Thomson upon this honourable and well-merited recognition of his labours. Through the kindness of that gentleman, we shall be enabled in our ensuing number to give our readers an account of the instruments which have been thus distinguished by the oldest and only Society in this kingdom for the encouragement of useful inventions.

HALF-YEARLY REPORT OF THE BIRMINGHAM DENTAL DISPENSARY.—Number of patients admitted during the half-year from January 1st to June 30th, 1860:—Males, 396; females, 360: total number, 756. Number of operations performed:—Stopping, 255; scaling, 47; extraction, 527; various, 47: total number of operations performed, 902.

FACIAL NEURALGIA.

By F. H. Thomson, M.D. and L.F.P.S., Glasgow.

(From the 'Glasgow Medical Journal' for April, 1860.)

Tic Douloureux has so often been the subject of discussion, and the theory of the disease is now so well ascertained, that any remarks bearing on its pathology would be altogether out of place in the short observations of the writer, whose object is to give his own experience in practice of a simulative tic, or neuralgia, often mistaken for the true disease, but having for its origin pressure upon the nerve by the confined dens sapientiæ struggling to escape from its narrow dwelling of bone; exostosis; caries of the teeth and sockets; necrosis; inflammation, caused by sudden chill or deranged circulation, ending in the formation of a small sac of matter; local pressure of the teeth upon one another, or, in fact, any or all of the various annoying list of complaints taking their origin in the teeth.

The practitioner has, on many occasions, to prescribe for and treat facial neuralgia; and though true tic is, luckily for humanity, a comparatively rare disease, yet, how often does one hear of a patient being laid up for weeks from what is denominated tic, originating in mere local causes! In fact, now-a-days, it is one of the fashionable complaints, especially amongst nervous females, who suffer themselves to be treated as confirmed invalids, and submit to tedious courses of medicine, when the true cause lies in some decayed tooth, deep-seated stump, or more frequently a hidden wisdom tooth. The mouth is the last place they think of having examined; and where definite treatment in the early stages, by the removal of the cause, might at once put an end to the whole affair, it is consistent with the history of all nervous complaints, that by long indulgence the symptoms assume a chronic form and simulate tic; so that in the end, from habit, the attacks recur with the same precision as if organic disease produced the paroxysms. The fits, also, appear worse at certain periods of the day, especially after eating, when the circulation is increased, and the nervous system is excited; and even the most skilful are often led astray, and seek for causes far beyond the mere local symptoms. In the writer's opinion, much human suffering might be saved by a proper and definite examination of the mouth in all cases of facial neuralgia, so as to define at once whether the cause of the complaint may not be simple of elucidation and easy of treatment.

Case I.—Miss G. of V., Nairnshire, consulted me in 1842; having for two years previous been suffering from serious neuralgic pains, and latterly from tension and slight swelling on the right side of the face. To such an extent did the periodical paroxysms recur, that life had almost become a burden; the walls of the antrum bulged out, and the patient had all the appearance of organic disease. The teeth were apparently sound, and although a thin serous discharge slightly exuded from the edges of the sockets, causing much fetor of breath, the symptoms were not so decided as to lead at first to definite treatment of the mouth, and the young lady's friends were naturally much alarmed. Having carefully examined and sounded all the teeth, I came to the decision of extracting at least one of the bicuspides, and upon doing so nearly an ounce of dark fetid matter was discharged. On still further investigation, the base of the antrum was ascertained to be very soft and spongy—in fact, quite in a carious state, extending back so far as the first molar. After some consultation, the second bicuspid and molar were extracted, and certain portions of the diseased bone taken away. I then carefully syringed the cavity with a weak solution of chloride of zinc, and introduced a pledget of lint, steeped in diluted eau de Cologne and laudanum. In twenty-four hours I removed the lint, again syringed with the chloride, and removed some portions of bone. The plugging was again replaced, and the same time allowed to elapse, when all the spicula were got out, and so far as observable only healthy bone was left. No internal growth could be discovered; and, gradually, after the lapse of three months, during which time I had ample opportunities of watching and treating the case, the cavity gradually healed up, leaving a very small opening, which slightly discharged, and which, by the use of astringent and sedative solutions, also closed in about a year. For months the paroxysms of pain kept returning, but with less and less vigour, till at last they disappeared altogether. There is nothing very peculiar in this case, further than that its previous history displayed all the symptoms, or simulated symptoms, of true tic so definitely, that with the exception of the slight enlargement of the antrum, no outward evidence existed to lead one to the true state of the case. The cause was, no doubt, very simple, probably some accidental chill acting upon a naturally excitable strumous diathesis.

Case II.—Mr B. F. of R——, aged fifty-five, consulted me in the year 1850, having suffered for six months, on the left side of his face, from severe lancinating pains, which gradually had assumed one or two of the types of true tic. The fits of pain came in paroxysms, and had all the terrible character described by Romberg, as stabbing, tearing, or crushing, and exhibited the twitching so characteristic of this terrible complaint. He had been under definite and severe treatment, but was at last advised to have his mouth examined. Although several of the front teeth were lost, and replaced by an artificial arrangement, the remaining ones were apparently quite sound and healthy. At first no feeling of pain could be excited, either in the teeth or surrounding parts, when severely tested and sounded, and I could discover no evidence in the teeth of his complaint. At last one day, having caught a slight cold, pain was clearly defined in the second molar, certainly not more than might be expected in an ordinary case of periosteal irritation. The feeling, however, did not yield to the usual remedies—abstinence and depletion—but continued to increase; at the same time, the paroxysms of tic became more frequent and severe. I decided on extraction. The tooth did not come away at once, although, as I thought, quite disengaged from its socket; but, with some trouble and a little cutting, it at last came, bringing with it a mass which at first looked like bone, but which on washing I found to be an unusually large dens sapientiæ, adhering by an attachment of perfectly defined cementum. For some days the paroxysms returned, but gradually ceased altogether, and have never since appeared. There cannot be a doubt that the cause, in this case, arose from the efforts made by the dens sapientiæ to escape; and the fang coming in contact with the posterior portion of the second molar, the edge of the crown pointed back towards the dental foramen, where the nerve and artery enter, producing pressure and consequent interrupted circulation. The adhesion of two distinct teeth by a definite bone or cementum structure has often been the subject of discussion, and many specimens do not exist so well defined as the one I now instance.

In this case the patient had almost been laid aside for months. I find many well-defined cases of this description in my note-book, but the one above mentioned may serve as an instance of this peculiar action.

Case III.—Is quite of a different class, rather obscure, and more like true tic in its symptoms. Being on a visit to a friend in Ayrshire, in the year 1857, I happened to meet Mr C. of K——, and before knowing anything of his case, was struck by his pale, careworn expression of countenance, sunken eye, and anxious look. Upon inquiry, I ascertained that he had been a victim of tic for three years. Ere leaving, I had an opportunity of witnessing his sufferings; for, on sitting down to dinner, he appeared pretty well, but seemed to dread the effect of mastication. No sooner had he swallowed the first mouthful, than a violent paroxysm came on, which obliged him to leave the room. He returned in about ten minutes, and managed with much difficulty to get a very scanty meal. I was told that this scene was renewed every day, and on all occasions when alteration of temperature was induced. In course of conversation, I suggested that some tooth might be, if not a cause, at least an aggravation, and made an engagement to see him next day. On careful examination, I could not find a single indication of decay. The teeth were perfect, and evinced no sensitive excitement upon percussion. The wisdom-teeth were all in their places, and appeared to have ample room. Upon repeated percussion, the patient made a motion indicative of slight pain in the right superior dens sapientiæ; and however unwilling to break ground upon such slight evidence, I decided upon extraction, and certainly found a cause, in the shape of an exostosed point on the end of the fang, about the size of a small pea. Although, in many instances, exostosis does not produce much pain in formation on apparently healthy teeth, yet in the true, hard description found in the points of the fangs, after a certain enlargement has taken place, the pressure upon the sensitive membrane lining the socket produces, in excitable, nervous constitutions, intense suffering, more especially when acted upon by any inflammatory action, whether chronic or otherwise.

The result of removal in this case gave a certain amount of relief, and for three weeks the paroxysms were neither so frequent nor intense. Gradually, however, they returned, and my patient again consulted me. On this occasion, distinct irritation was produced by percussion upon the second molar of the same side; and as a certain amount of success had attended the first operation, I did not hesitate in again resorting to extraction. I did not again see my patient for three months, when I ascertained that after the first fortnight he had entire freedom from pain. Up to this date no new symptoms have appeared, but I have no doubt that the fangs of all the teeth are more or less exostosed; and it is just possible that some peculiar state of the circulation may increase the tendency to renewed deposit, in which case new complications are certain to arise.

The pathology of this case seems to be, that my patient having been much abroad, and, in the course of a colonial life, having taken a good deal of mercury, his liver was liable upon the slightest occasion to become engorged, causing nervous headache, constipation, and consequent interruption of the regular functions. Although an exostosed tooth may be quiet during health and absence from excitement, on the slightest occasion the demon is quite prepared to show his horns.

In the course of practice many thousands of teeth naturally pass in review; and although in multitudes of cases exostosis is clearly visible, yet in comparatively few does the extreme irritability described in the last case develop itself. The exciting cause of exostosis is not always clearly defined, for it is descernible in teeth where caries is both present and absent, and is no doubt an increased deposit of cementum thrown out by constitution or local disturbance.

Exostosis, in the opinion of the best writers on the subject, would seem to be a production of the peridentium, a membrane supposed to cover the fang of the tooth, and thrown out in the shape of cementum from its inner surface, being in no way dependent on the periosteum covering the socket; this hypothesis being justified by the fact that the root of a tooth, although the subject of exostosis, never becomes anchylosed to the jaw. Had the exostosis been the product of the periosteum, osseous union must sometimes have been the result. Exostosis is more frequently observed in persons of a gouty diathesis, and in many cases assumes an hereditary type. In some cases, pre-existing syphilitic disease may have been the devolping cause Should the predisposition exist, some slight injury may rouse the incipient disease. Dr Richardson, in one of his late lectures, states in corroboration of this gouty hypothesis, that in examining some specimens of exostosed teeth, he observed that there existed between the fangs of two of them a softish, dry, whitish-yellow substance, which, closely connected with the tooth, was clearly not of the same structure. Filing down the fangs of these two, and subjecting them to analysis, he says—" I precipitated from them crystalline bodies which have the characteristics of uric acid; that acid such as we have seen, is present in excess in gout, and forms with soda the gouty concretion so often met with in the joints. Coupling this fact of the detection of uric acid in the way described above, with certain symptoms which mark, as I have thought, the origin of dental exostosis, I was led some time since to link the exostosis with the gouty diathesis. I have thus examined exostosed portions of sixty teeth, not individually, but in four divisions, so as to obtain sufficient matter for analytical inquiry. In one of these groups, crystals of uric acid were distinctly yielded; in the remaining there was no evidence whatever of the acid. The quantity of acid, moreover, supplied by one of the four groups (in which was included the pulverized mass of ten teeth), yielded less evidence of the acid than did the two teeth used in the first experiment. I am bound, therefore, to conclude, that in the later observation when the acid was found, it was yielded by an exceptional tooth, and that the deposit of the acid in combination with a base in, or, I had better say, upon an exostosed growth, is of rare occurrence, but so well marked occasionally as to leave no doubt of its existence."

In dental exostosis the two distinctions must be observed, whether arising from irritation consequent on caries or some constitutional disturbance. The symptoms of exostosis resulting from caries are very similar to those produced by periosteal inflammation, thickening, and discolouration of the gums, and an inclination to bleed or discharge a thin serous fluid of a fetid description. This only takes place after inflammatory attacks, resulting in the destruction of the nerve and soft tissues.

Exostosis arising in comparatively or seemingly sound teeth, and much the cause of the simulative tic thus described, takes its origin primarily in irritation caused by some lesion, the result of rigour, or even reactionary influence upon the minute vessels supplying these organs. In the writer's opinion, the indulgence of very hot and cold food alternated rapidly, will in time produce irritability of the fangs and sockets, and bring about the peculiar action by which cementum is thrown out. Eating ice, for instance, after indulging in a hot dinner, must be a severe test; and this view is borne out by the vicious effects visible in the teeth of our transatlantic brethren, who so much indulge in hot and cold drinks almost at one and the same moment. It may be urged that the early decay visible amongst the teeth of the youth of America takes its origin in a totally different cause, viz., that constitutionally they are not so nervously vigorous as the pure Saxon race. If this be the case, the more will be the effect of the morbid action upon teeth naturally not strong, by sudden or violent reactionary circulation. In many cases of sudden fright, one often hears of the hair turning white in one night. On the teeth the action is not quite so definite or rapid, but damage is invariably produced, and, in many cases well recorded, the teeth have become loose from either sudden news, producing great excitement, or terror. A case lately came under the eye of the writer, which may be instanced as a useful illustration of this theory. A young married lady whose husband had gone to the Crimea, and was killed in action, received the news one morning, and naturally was plunged into much misery and violent nervous excitement. After a time she so far recovered; but her teeth, which formerly had been very sound and perfect, became loose all round, both in the upper and under jaws. I was consulted, and having seen in my practice many similar cases, was at no loss as to the true cause. In youth a morbid action is often temporary, and, with time and judicious treatment, may be overcome. In this case I used various astringent lotions, combined with morphia; also alkaline washes, such as chlorate of potass, chloride of soda, changing very often. I also exhibited the chlorate of potass internally in 10, 15, and 20 grain does; by these means a gentle reactionary tone was induced in and upon the weakened vessels. Time, fresh air, ease of mind, will, of course, do much in such a case where the patient is young; for, in those of more advanced years, reaction is difficult: the action goes on, and the teeth in the end drop out. In this particular case, three years have now elapsed, and at this date a most decided improvement has taken place. I have no doubt, if the general health continues good, a cure will be effected.

In this peculiar phase of disease little or no pain is exhibited, and often the only sensation is a hot feeling, and an inclination to press the teeth together.

The case under consideration partook much of the nature of partial necrosis, or death of the membranes giving nourishment to the teeth; but the same cause, namely, increased vascular engorgement, will induce in persons of a certain diathesis that peculiar action productive of exostotic deposit. All action must have its consequent reaction, and the vessels in and supplying the teeth and investing membranes are so minute and remote from the great fountain-head, the heart, that undue action frequently repeated must in the end produce irritation, in some cases resulting in exostosis, in some total absorption, or both. The same theory that leads one to use snow in a frostbite, should be a guide to the application of stimulating lotions in cases of sudden and violent reactionary influences, producing in these remote and minute vessels and nerves impeded circulation and impaired sensation.

In all cases of facial neuralgia, whether arising from exostosis, disease of the antrum, necrosis, or simple inflammation of the membranes, and whether severe or otherwise, there is throughout an evident effort of nature to expel the offending member; and much misery might be saved if practitioners would wisely assist, instead of counteract. Palliative treatment may be very well till the case be defined as one of decided exostosis; but when once ascertained, eradication of the diseased tooth or stump should at once be insisted on.

The symptoms of true facial neuralgia, the result of organic disease, are thus described by Romberg in his able work on the 'Diseases of the Nervous System,' and in that portion devoted to the neurosis of sensibility:—"There are generally no premonitory symptoms, but occasionally a sense of tension, itching, or creeping precedes The pain comes on in paroxysms, at some point of the face or cavities; it is confined to one side, and the stabbing, crushing, and tearing pains are of the most agonizing character. They rarely remain limited to one spot; they generally dart with the rapidity of lightning, forwards and backwards, to near or more remote points, and, with rare exceptions, maintain the same course in every paroxysm. The paroxysm is made up of small attacks, and recurs at irregular intervals. The more frequent its renewal, the longer the disease lasts, the more sensitive the affected side of the face becomes to gentle, unexpected, or superficial contact, which generally gives rise to an immediate and violent accession of pain. Mere touching or stroking the part, or passing the razor over it, may suffice to induce it; whilst the application of strong pressure generally fails to do so, and even affords relief Trifling movements of the facial muscles, in speaking, chewing, or blowing the nose, excite the pain. During its continuance the muscles of one or both halves of the jaw twitch, or continue in an immovable, fixed position. The complexion is frequently altered; the painful part looks flushed, and shines as if it were oiled. The arteries pulsate, the veins are tumefied; the temperature of the suffering portion is exalted, whilst the hands and feet are chilled. At times the whole body trembles, and the sensitiveness is generally increased."

Although in most cases of simulated tic all the symptoms here described may not be well defined, yet enough generally exists to lead astray, and render difficult an accurate diagnosis; for although wanting in many instances the idiopathic characters of true organic lesion, the general appearance of the patient under a violent paroxysm is so similar that much experience is necessary to define in the early stages; and it might be well for all practitioners, whether specialists or otherwise, to inculcate the propriety of local investigation.

New Method of producing Local Anæsthesia.—Mr Richardson, Dentist, in a recent communication to the 'Lancet' says: "The subject of local anæsthesia has much excited the attention of the Profession lately. Dr Richardson, Mr Nunneley, and others have devoted much time and research to it. Narcotics, congelation, inhalation of ether and chloroform, and lastly, electricity, have all been tried; but from some practical disadvantages in their application, and from the occurrence of dangerous and even fatal effects, none of these have met either the wants of the case or the general concurrence of the Dental Profession. In pursuing a series of experiments for effecting certain improvements in the 'Tooth Protector,' a notice of which apparatus was inserted in the 'Lancet' of 1858, I have devised a plan for causing local anæsthesia during the extraction of teeth without producing a corresponding effect in the system generally, viz., by immersing the affected part in chloroform, and including in the part immersed as much of the adjacent structures as may be required. It is obvious that a plan so simple must be universally applicable, and should its reputation be maintained, prevent the escape of chloroform, and thus intensify its local effect. The cup is about half filled with cotton wool, which is then saturated with a sufficient quantity of chloroform, generally from ten to fifteen drops. The time within which local insensibility is produced varies from seven minutes to a quarter of an hour. It is true that the local anæsthesia is not in all cases equally complete; but even where pain occurs, the remedy will be found to moderate it to a point within which it becomes perfectly tolerable, and has lost the distressing agony of tooth-extraction. It is important for the operator to remember that, as soon as insensibility of the part ensues, the cup should be removed, and extraction instantly performed. Of sixty cases on which the foregoing cases are based, only two occurred in which the remedy failed to mitigate the pain; whilst in ten cases the local insensibility during extraction was complete."

ON THE TEETH AND MAXILLARY BONES IN THE HIGHEST FORMS OF QUADRUMANA,

CONSIDERED IN RELATION TO THE SAME STRUCTURES IN THE HUMAN SUB-CLASS.

(Continued from page 331.)

IN the former part of this article we compared the superficies of the bony palate in Man with the same structure in the Chimpanzees and Orangs. Such variations as are met with in the skulls of different varieties of the human race we propose to consider in a future paper. We may, however, remark here, that although the premaxillary palatine suture is usually entirely obliterated at a very early period in the human *cranium*, traces of its existence are occasionally found both in adult European skulls and in those of the dark races. A careful examination of the collection of *crania* in the Museum of the Royal College of Surgeons will satisfy the inquirer on this point. In the skull of the human idiot figured in the first volume of the 'Zoological Transactions,' the same condition is represented, and its occasional occurrence has not only been noticed by Lawrence and other modern writers, but it was especially remarked by some of the older anatomists. In Vesalius's great work, 'De Humani Corporis Fabricâ,' edit. 1555, is an engraving of a skull exemplifying this peculiarity. Let it be, however, distinctly understood that in such exceptional cases the suture has never been found to extend through the *alveolus*. Galen, as Vesalius infers, debarred the practical study of human anatomy, and, restricted to the dissection of the lower animals, was led into the error of reckoning an intermaxillary amongst the separable bones in Man.

In pursuing our comparative examination, we would now direct the reader's attention to the facial portion of the bones constituting the upper jaw. As is the case with the bony palate, the figure and proportions of the parts of the premaxillary and superior maxillary bones which enter into the formation of the face are, to a considerable extent, influenced by the configuration and relative magnitudes of the teeth which are implanted in them. We propose to reserve the study of the teeth themselves to the last portion of this article; but if, in the examination of the bones which form their *alveoli*, we should at times be guilty of forestalling our description, and thus of incurring hereafter the charge of repetition, we must crave indulgence for a fault it is difficult to avoid in a verbal delineation of contiguous and mutually-dependant structures.

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* On the Classification and Geographical Distribution of the Mammalia. By Richard Owen, F.R.S. London, 1859.

Catalogue of the Osteological Series in the Museum of the Royal College of Surgeons. 4to, 1855.

On the Zoology of the Chimpanzee and Orang Utan. By R. Owen, F.R.S. Zool. Trans., vol. i., London, 1835.

Osteological Contributions to the Natural History of the Orang Utans. By Richard Owen, F.R.S. Zool. Trans., vol. ii.

Osteological Contributions to the Natural History of the Chimpanzees. By Professor Owen. Zool. Trans., vol. iii., 1849.

Osteological Contributions to the Natural History of the Chimpanzees and Orangs. By Professor Owen, F.R.S. Zool. Trans., vol. iv., 1858.

In the Human sub-class, from and before the period of birth, we search in vain for any mark of separation between the facial portions of the premaxillary and superior maxillary. Consolidated together, no remnant of suture remains to mark an original distinction; and in the bony face there is no landmark like the anterior palatine *foramen* to remain a lasting memorial of their limits. At or about the period of the second dentition, consolidation is effected in the genus *Pithecus*. In the Great Orang (*P. Satyrus*) the obliteration of the suture does not take place until the full development of the great canines. Its traces are, however, occasionally to be found in adult *crania*. Thus, in the skull of a large male Bornean Orang, numbered 5051, in the Museum of the College of Surgeons, the line of demarcation is distinctly discernible. In the Gorilla more or less of the suture is permanent, and evidences, even in the mature skull, that remarkable upward expansion of the premaxillaries which is characteristic of the species. The Chimpanzee loses the line of separation sooner than any other Ape. In the *cranium* of an immature *Tr. niger* in the same collection (No. 5171), having the twenty deciduous teeth in place, it is so far obliterated as to be traceable only at the sides of the nasal aperture. The remnant of articulation is so small, that Mr Lawrence, in referring to this specimen, states, "not a vestige of the sutures separating this bone is to be seen." They still, however, exist on the palate, and, as we have said, at the sides of the nasal opening.

The breadth of the anterior surface of the premaxillary in Man is limited by the incisor teeth; the inner margin articulates by a permanent suture with the corresponding bone of the opposite side. This median articulation is not depressed below the level of the neighbouring surface; on the contrary, it is slightly raised, constituting a prominent ridge, and terminating above in a process which projects forwards,—the anterior nasal spine. This process forms the commencement of the nasal ridge, supporting the *septum narium.* In every race of Man, the median cartilage of the nose receives an osseous support which projects in a greater or less degree beyond the margin of the bony nasal cavity. The anterior alveolar surface is slightly undulated by the fangs of the incisor teeth, but the amount of unevenness is insignificant when compared with the prominences and depressions arising from the same cause in *P. Satyrus* and *Tr. niger.* In depth, from the lower margin of the nasal opening to the alveolar border, the human premaxillary is short, and in the direction of its plane it offers a strong contrast to the Quadrumanous configuration. In the white races of Man the premaxillary is usually vertical, although exceptions are not of unfrequent occurrence ; in the melanous varieties there is a somewhat greater projection forwards, but the degree to which this occurs differs much in individuals. It is the fashion to choose the most debased specimens of *crania* as typical of the dark races to which they belong. The fairness of this proceeding would be equalled by selecting the types of European form from amongst a half-starved Irish peasantry; or, on the other hand, by estimating the cranial capacity of the population of Europe from an examination of the head of a Humboldt or a Cuvier. When the investigation is fairly made, and is farther extended by comparing the contour of the human jaw with the prognathic muzzle in the Orang or Gorilla, the variation in the projection of the anterior *alveoli* in Man must be acknowledged to be slight and insignificant.

In the genus *Pithecus* (Orangs) the premaxillary extends in width beyond the incisor alveoli, furnishing a considerable portion of the *diastema,* or space which separates the second incisor tooth from the great laniary. In the young skull its upward extent can be traced above the lower margin of the nasal bone. This is well shown in a skeleton of a young female Orang (No. 5058) in the Hunterian Museum. The mesian articulation between the premaxillaries is situated in a depression which below becomes a deep *sulcus* between the prominent *alveoli* of the central incisors. In many adult skulls this suture is found obliterated, its course being only indicated by small vascular *foramina* and grooves. The anterior nasal spine is absent. In width the premaxillary of *P. Satyrus* exceeds the measurement of the same bone in the Chimpanzee and Gorilla ; and whilst the *alveoli* of the incisors are full and prominent, the intervals between them are proportionately depressed. The depth from the nasal aperture to the incisor margin is greater than in either Troglodyte, and the prognathic development of the jaw is, in the present comparison, at its maximum. In these latter respects the Great Orang recedes farther from human configuration than either species of the genus *Troglodytes.*

The breadth of the premaxillaries is the same in *Tr. niger* and *Tr. Gorilla:* therefore, the relative breadth is less in the larger species. The depth below the nasal apertures, the prognathic development, and the prominence of the incisor *alveoli*, are less in the Gorilla. The nasal portion of the premaxillary extends to a variable height on the side of the nostril in the Chimpanzee. In the young specimen before alluded to (No. 5171) it stops short of the nasal bone; in another specimen it articulates with that bone by its pointed extremity, which separates a small portion of the nasal from the superior maxillary. In *Tr. Gorilla* we have, however, a distinguishing feature, not only in the height to which the nasal portion of the premaxillary extends, but in the remarkable expansion of the ascending process. It spreads into a triangular plate of bone, which articulates by its inner and superior margin with the nasal, by its outer margin with the superior maxillary, completely shutting out the latter bone from a share in the formation of the nasal aperture. In one skull of *Tr. Gorilla*, described by Professor Owen in the fourth volume of the 'Zoological Transactions,' this upper expanded portion of the premaxillary is a separate piece, insulated by a continuation of the premaxillary suture on the inner side of the nostril into the outer one, about nine lines below the nasal bone. These sutures are persistent in adult life; they may be found more or less obliterated in the *crania* of aged individuals of the species, but in the adult skeleton at the College of Surgeons they will be seen to be perfectly distinct. The mode of articulation between the nasals and the premaxillaries and maxillaries is worthy of attention. In the Gorilla they articulate by true sutures, not by harmoniæ, as in *Troglodytes niger* and Man.

As in *Pithecus*, the median suture between the premaxillaries is situated in a smooth depression. There is no approach to the prominent ridge which sustains it in Man. In some of the adult skulls of *Tr. niger* we have examined, it is obliterated. It is probably more persistent in the Gorilla, but in the aged *cranium* in the British Museum it appears to be nearly erased. In both species the anterior nasal spine is entirely wanting; the ridges for the articulation of the *septum narium* commence within the nasal cavity, behind an arched transverse eminence or bar which forms the anterior boundary of the opening. This transverse ridge is well marked in the skull of the Gorilla. Lastly, as in *Pithecus Satyrus*, the premaxillary bone in *Tr.*

Gorilla extends beyond the outer incisor, and constitutes a large portion of the *diastema* interposed between that tooth and the canine.

These points of differentiation are most of them specific. Their production is to be referred to the influence of no accidental circumstance, such as the habits of a species, or an increased osseous growth depending on a greater development of attached muscles. Neither are they to be explained on any theory of gradational development. We know no more of the reasons for the peculiar conformation of the premaxillary bones in *Tr. Gorilla*, or the continuation of the premaxillary sutures in *P. Satyrus*, and their early obliteration in *T. niger*, than we do of the ultimate causes on which depend the unalterable properties of the metals and gases of the inorganic world.

In extending our comparison to an examination of the superior maxillary bones, the following are some of the points to which we would call attention as especially characteristic of human structure. In the *cranium* of Man this bone is distinguished by its short antero-posterior measurement, its sub-quadrate form, the near parallelism of its posterior border with the anterior margin of the premaxillaries; by the minor development of the *alveoli* for the canine and molar teeth; by the backward concavity of the portion it forms of the external nostril leading from the nasal to the anchylosed premaxillary; by the concavity of the surface which descends from the margin of the orbit to the *alveoli* of the premolars; by the single infra-orbital *foramen*, and the proximity of that *foramen* to the orbital margin; by the restricted dimensions of the *antrum*, which neither encroaches on the malar bone in one direction, nor on the inner side of the orbit in the other. In all the Anthropoid Apes the superior *maxilla* is of much greater comparative size than in Man. The tumid socket of the great laniary tooth carries the anterior portion of the bone forwards, and expands it laterally. The size of the canine *alveolus* is so great as completely to exclude the external nostril from the lateral view of the *cranium*. In *Tr. Gorilla* the laniary is of somewhat larger proportional size than in *Tr. niger*, and a corresponding difference is impressed on the anterior contour of the maxillary bone; but in both species the deviation from human configuration is enormous. In *P. Morio* and *P. Satyrus* this anterior expansion of the *maxilla* is as remarkable, the corresponding part of the jaw being even broader in the Great Orang than in the Gorilla. In a front view of the skull, the great canine shuts out the molar series from sight, with the exception in the Gorilla of a small portion of the upper external surface of the first premolar. In Man a corresponding view reveals the whole molar series with the exception of the last true molar, and this in the white races is not always excluded.

Although the posterior border of the superior *maxilla* in the Gorilla is at right angles with the alveolar, yet, owing to the obliquity of the premaxillaries and the prominence of the canine *alveoli*, there is no approach to parallelism between it and the anterior. In *P. Satyrus* the posterior contour of the maxillary bone has a direction more obliquely forwards than in the Great Chimpanzee. The *alveoli* of the molar series are well developed on the external surface of the jaw in both genera. In *Tr. Gorilla* this character is at its maximum. The premolars differ from those of Man, in being implanted by three roots, two of which are external. The complexity of the alveolar border depending on the prominent double *alveoli* of these teeth is a marked feature in the cranium of the Gorilla. The nasal process of the superior maxillary in the Chimpanzee does not mount vertically, as in Man, but slopes backwards, as in the Baboon. The surface which extends from the premolars upwards towards the orbit in *Tr. Gorilla* is convex and tumid, and contrasts strongly with the concavity which is observed in the human *cranium.* The infra orbital outlet is usually single in *Tr. niger*—sometimes single, but more frequently double, in *Tr. Gorilla ;* and there are three *foramina* present in the skull of the Orang. The position of these openings is another point of difference. They are situated at a greater distance from the orbital margin in the Gorilla and in *Pithecus Satyrus*, somewhat higher in *Tr. niger*, the latter in this particular more closely corresponding with human structure. Lastly, the extent of the *antrum* in the Gorilla far surpasses its dimensions in the human cranium; it extends externally into the malar bone, and on the inner side encroaches on the orbit. In one skull of an old male, Professor Owen found it divided by what appeared to be a second wall, having a cribriform or reticulate structure. The orifice of the antrum is of a rounded form, and is covered by the overhanging inferior turbinal bone. At the upper part of this orifice the lacrymal canal terminates: in Man the termination of this canal is in advance of the antrum.

In a side view, the relative position of the alveolar border to the cranial cavity will be seen to differ greatly in Man and the higher Quadrumana. In the Ape, the upper jaw projects downwards far below the base of the shallow *cranium :* in Man, on the contrary, the great depth of the brain-case brings the mastoid process almost to a level with the alveoli of the superior maxillary bone. F. C. W.

(To be continued.)

MEMOIR ON TUMOURS OF THE DENTAL PERIOSTEUM.

By E. MAGITOT, M.D.

(Read before the Chirurgical Society of Paris, April 13th, 1859.*)

Translated by ROBERT T. HULME, M.R.C.S., F.L.S.

(Continued from page 343.)

SECOND PART.

CASES.

GROUP I.—FIBROUS TUMOURS.

PLATE, FIG. 1.

CASE 1.—*Fibrous Tumour on the roots of the first lower molar, on the right side.*—(January 26th, 1858.)—Fig. 1.

B., a cabinet-maker, age twenty-six, of a good constitution, had suffered for some years from pain in the first lower molar on the left side, which at that time became decayed. No treatment was had recourse to, but the tooth gradually became quite insensible.

A year ago there was some return of pain in the part; but the patient observed that this was of a very different character to what he had suffered from formerly, and which appeared to have arisen from simple caries. The pains which appeared during the past year were slight, dull, and not fixed to one spot, spreading occasionally to the ear and temple of that side of the head, rapidly disappearing and returning from time to time, but retaining the same mild characters. This condition was very bearable until about three months ago, when, without any appreciable exciting cause, pain suddenly occurred opposite the tooth in question; but this time, instead of diminishing, it gradually increased and acquired special characters; it was continuous, there was much tension of the parts, the pain was increased when mastication was attempted, and it spread over the face, especially about the temple and the ear. The patient was recommended to use opiates locally, and at the end of six days the symptoms disappeared. About the same time, the first lower molar of the right side became decayed, giving rise to symptoms indicative of acute inflammation of the dental pulp, and in consequence of which it was extracted; this tooth, which the patient had preserved, showed no traces of any alteration having taken place in the roots. This peculiarity, nevertheless, possessed a certain amount of interest, because the extraction of the tooth having compelled the patient to eat on the opposite side of the mouth—that is to say, on the same side as that on which the tumour was situated—it brought on a recurrence of the symptoms.

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* Baillière, Lond., 1860.

Thus, then, since the first attack, the patient had experienced three others at intervals varying from fifteen days to a month. These attacks, which were identical with the first, lasted from four to eight days: during this time the gum was slightly swollen; the tooth appeared to be too long, and projected beyond the level of the other teeth; the pains spread to the ear and temple, and mastication was prevented. Three weeks back there was an attack of a more intense character than the others, which at the end of eight days terminated in a small abscess on the external surface of the gum opposite the diseased tooth. The abscess opened spontaneously.

This morning the patient had a sudden paroxysm of acute pain, similar to those which usually occurred at the commencement of an attack, when he at once came and consulted me.

Present State.—The teeth are well-formed and firmly implanted in the jaws; only one tooth is deficient, that which had been extracted three months ago: the first lower molar on the left side is from the $\frac{1}{300}$ to $\frac{2}{300}$ of an inch longer than the others; it is loose, and very painful when touched. The gum around the diseased tooth is partially absorbed and separated from the surface of the tooth, the margin is livid and irregular, pressure of the gum is painful. The tooth is greatly decayed on its posterior surface, but the cavity when examined by the probe is quite insensible; the neck of the tooth is surrounded by a white purulent fluid, which bathes the margin of the gum; the cheek is not swollen.

I diagnosed a tumour of the periosteum, and extracted the tooth. The operation was easily accomplished by the forceps, but was accompanied and followed by most acute pain in the part, and caused a recurrence of the pains in the temple and in the ear. The patient was cured, and continued well a year after the operation.

Examination of the Tooth.—The caries has completely extended into the cavity of the pulp, the latter organ having been entirely removed; a vertical section of the posterior fang shows that the vessels and nerves of these roots have also disappeared.

The space which separates the roots is filled by a tumour which passes on both sides, beyond the boundaries of the tooth, but principally externally, where the projection is most marked (fig. 1). The size of the formation is equal to that of a large bean; its form corresponds to that of the interval between the roots—that is to say, it is of an oval form. The boundaries of the tumour are not, however, very precise; for it seems to have extended itself partly over the whole of the anterior surface of the roots, which is invested with loose shreds of periosteum. The tumour is of a whitish colour, but on the extremities of the roots are patches of a bright red, showing traces of local inflammation. The periosteum on the posterior surface of the roots appears to he healthy.

Microscopic Examination.—(M. Ch. Robin, January 27th.) —The mass of the tumour consisted of a loose lamelliform network, and of a large quantity of an amorphous substance containing pus. In the tumour there was also some embryoplastic nuclei and fusiform bodies; there were some cytoblastions and a considerable number of capillary vessels, especially at the apices of the roots, where the tumour was much injected.

CASE 2.—*Fibrous Tumour developed on the roots of a first right upper molar which was attacked by caries.*—(February 13th, 1858.)

Eugene R., thirteen years of age, of a good constitution, has suffered for the last three or four years from the first upper molar on the right side, which was decayed, and during that time, according to the mother's account, had given rise to the symptoms which usually accompany this disease. These disturbances had, however, ceased for nearly a year; when, two years ago, fresh pains occurred, but this time with quite different characters. At first it was a dull pain, deeply seated in the superior maxillary bone, increased during mastication, and apparently situated at the extremities of the roots of the first molar on that side. At the commencement these pains were slight and indistinct, producing uneasiness rather than actual suffering, and the child was compelled to eat on the opposite side to prevent the jarring of the tooth in mastication.

Six months ago the symptoms became more marked; the pain was constant, lancinating, and became very acute upon the least shock to the tooth, without, however, spreading in the usual manner to the neighbouring parts. The cheek was swollen, and the tooth appeared to the child to be considerably elongated. Some general disturbance supervened, such as headache, slight fever, and want of appetite; at the end of eight days the symptoms subsided.

Some months after the first disturbances of which we have spoken, when there was only a little uneasiness in mastication and slight swelling of the cheek, a fresh attack, precisely similar to the previous one, took place, and terminated in the course of a few days. After another interval of two months there was a third attack, and lastly, about four days ago, and a month after the previous disturbance, a fourth, when the patient was brought to me for advice.

Present State.—The right cheek is a good deal swollen, the centre of the swelling being opposite the superior maxillary bone. The skin is not red, but there is a sensation of deep-seated pain upon pressure with the finger. The first upper molar on the right side is the seat of the disorder; in the centre of the masticating surface is an extensive caries, which communicates with the pulp cavity, that organ having entirely disappeared. The caries is, therefore, quite insensible. The tooth is very loose, and projects beyond the others. Striking the tooth gives rise to acute pain at the bottom of the alveolus: the gum is separated from the tooth; it is of a livid colour, and has, even on its inner surface, several minute ulcerations in the midst of a red granular base.

I diagnosed a tumour of the dental periosteum, and proceeded to extract the tooth. The operation was easily accomplished; but it was very painful, and accompanied with a good deal of hæmorrhage. The patient was not relieved at the time.

Examination of the Tooth.—The tooth was opaque, and of a yellowish white colour; there were no remains of the pulp, or of the vessels and nerves in the roots. The inner fang had a soft tumour attached to its extremity, which had been partly torn away in the operation from the surface of the tooth. Its size was about that of a small nut; it spread partly over the external surface of the root into the angle which it forms with the external roots; it was of a red colour, and very vascular: the remainder of the periosteum was thickened, indicating a certain amount of inflammation, or possibly an extension of the local disease.

Microscopic Examination.—(M. Ch. Robin, February 13th.)—This showed a dense fibrous network, impregnated at certain parts with pus, and permeated by a great number of vessels. The whole of the tumour was covered with a layer of large epithelial cells of a spherical or pavement-like form, and containing one or two nuclei.

CASE 3.—*Fibrous Tumour developed on the second lower molar on the left side.*—(June 12th, 1858.)

Madame C., age thirty-six, of a good constitution, and at present having lost none of her teeth. About five months ago she began to feel a dull, continued pain in the second lower molar on the left side, which, however, appeared to be free from caries. The pain was not much, but extended to the face, and particularly to the ear of that side, in which it gave rise to a slight singing noise; at the same time, the tooth appeared to have lengthened, and prevented mastication on that side of the mouth. These symptoms entirely disappeared at the end of four or five days. About a month afterwards they reappeared, retaining the same characters; but this time the singing in the ear was accompanied with deafness. The present attack was further complicated by a certain amount of swelling; but it terminated like the previous one, after lasting for five or six days, only leaving behind it a slight uneasiness in mastication. After this second attack there were several others, at intervals of about fifteen days, characterised by the same symptoms, but which appeared to increase with every fresh attack. At length, about three days ago, there was an attack of much greater severity than any of the former ones; so much so, that the patient, who had hitherto allowed the symptoms to subside of themselves, could no longer bear the pain, and in consequence she came and consulted me, requesting to have the tooth extracted.

Present State.—The cheek is much swollen and painful to the touch, and there is also some redness of the skin. The mouth cannot be completely opened as in its normal state; the teeth are all free from caries: the second lower molar on the left side projects a little above the other teeth; it is displaced from its natural position, being directed outwards; it is very much loosened; the gum is partly absorbed, red, thick, and separated from the surface of the tooth, which is covered with a slight layer of tartar. The least movement of the tooth produces pain, and striking it vertically is unbearable; there is no alteration in the crown of the tooth, and when the exposed parts of the roots are examined by means of a probe, it comes in contact, in the space which separates them, with a part that is painful, and bleeds upon the slightest touch. I diagnosed a tumour of the periosteum, and extracted the tooth; the operation was easily accomplished, and was followed with a considerable amount of hæmorrhage. Three months afterwards the patient had no return of the symptoms.

Examination of the Tooth..—The periosteum was thickened throughout the greater part of it, but more particularly towards the extremities of the fangs. In the interval between the fangs, especially at its upper part, there was a soft, reddish-coloured mass projecting a little beyond the level of the tooth, of the size of a large pea; it was soft, the surface irregular, with here and there red spots indicating an injected state of the tissues. The tooth presented no traces of caries.

Microscopic Examination.—(M. Ch. Robin, June 2nd.)—The tumour consisted of a simple fibrous network, more or less compact in different parts, and traversed by numerous capillary vessels. In its substance there were a few fibro-plastic nuclei, and numerous leucocytes (globules) of pus.

(To be continued.)

Dr Charles Kidd, in a paper on the 'Nature of Death from Chloroform,' read before the British Association at Oxford, introduced the much-vexed question of the class of cases where chloroform is comparatively safe, and that class where caution is required in the administration. Dr Kidd furnished in the paper a careful analysis of all the recorded deaths from chloroform given for operations, which amount to about 100, as also an analysis of twenty-five additional deaths from the administration of ether and amylene. Dr Kidd is inclined to doubt if the deaths from chloroform have been, as held by Dr Snow, from cardiac syncope, from overdose of chloroform, sinking of the heart, &c. The fact of tens or hundreds of thousands of patients taking chloroform with perfect safety, even in the largest possible doses of six, or eight, or ten ounces of chloroform at a time, many remaining an hour or two hours under chloroform in deep sleep, the pulse little if at all affected, the heart undisturbed, &c., he cannot reconcile with the other fact, that in all the fatal cases the dose of chloroform has been very small (a drachm or half-drachm), the death has occurred before deep anæsthesia had commenced; in many deaths, also, the heart had gone on beating, but the breathing had ceased! Judging from experiments on animals, and what he has himself seen in the post-mortem examination of patients in hospitals who have died from chloroform, as well as judging by the view of Brown-Séquard on chloroform, Dr Kidd thinks the larger number of deaths arise from an excitant reflex action of the chloroform in the early stage, and not a deep, direct, and later depressing action or exhaustion; and that the base of the *brain*, not the heart, (through a reflex irritability from the pulmonary organs, especially from the pneumogastric nerve, as well explained by Einbrodt and Weber,) is the part really at fault. We have accordingly to dread hysteric and nervous complications in the brain, as well as trivial operations where chloroform or bad chloroform is given in a trivial manner in small doses, infinitely more than we have to fear diseased valves of the heart, or the fullest doses of chloroform continued with due care even for an entire hour. This reflex or excitant action of the pneumogastrics may even stop the heart, if not hurried over by cautiously increasing the dose of chloroform, as any other excitant of the pneumogastric is found to do; or this reflex action may, by vaso-motor disturbance and dilatation of vessels in the brain, lead to increase of blood and sudden "fit."

COLLEGE OF DENTISTS OF ENGLAND.

MR HULME'S LECTURES ON THE STRUCTURE AND DEVELOPMENT OF THE TEETH.

On Tuesday evening, February 14th, Mr Hulme delivered his Third Lecture on the Structure and Development of the Teeth. The present lecture commenced the examination of these organs in the Mammalia. In tracing the modifications which occur in the teeth of fishes and of reptiles, they were seen gradually to diminish in number; and in the last forms which were noticed in the previous lecture—viz., the Crocodiles—they were confined entirely to the margins of the jaws, and henceforth they are not met with in any other situation.

Amongst the present extensive and diversified group of animals, the majority are inhabitants of the land, and crop the herbage which is around them, or pursue their living prey; others, as the Bats, are denizens of the air, and these, while hunting in the summer twilight for their insect food, rival the bird in the activity of their movements; the Seal, the Beaver, and the Walrus dwell partly on the land, but pass the greater portion of their lives in the water; while, last of all, the Cetacea are entirely aquatic, and are the largest of the finned inhabitants of the ocean. The various habits which these different modes of life entail upon the animals, and the diversity in the nature of their food, are necessarily accompanied by corresponding modifications of the dental organs.

The bones in which teeth are implanted in the Mammalia consist of the two superior maxillary bones, the inter or pre-maxillary bones, and the inferior maxillary bone. The premaxillary bones in the human subject correspond to that portion of the upper jaw which contains the incisor teeth. The original separation of this portion of the maxillary bones is only to be detected at an early period of embryonic life; remains of the suture which united them may be detected at a later period, but soon after birth all trace even of a suture is usually lost. Some anatomists have denied the existence of the premaxillary bones in Man, and maintain that it forms a distinctive mark between him and the lower animals. Independently of the remains of the suture, which, as has just been stated, can be detected until a late period in the fœtus, the fact that when double hare-lip occurs, the separation corresponds to the premaxillary sutures, and that the palate is cleft in the same direction, would of itself be sufficient to indicate that the premaxillary bone is also a separate element in the human subject, but that its early coalescence with the corresponding maxillary bone renders it extremely difficult to obtain it as a separate element of the skeleton. In the lower animals, the premaxillaries always remain as separate and independent bones, filling up the interval which exists between the maxillaries. The lower jaw consists of two halves, each of which is developed from a single centre, and is one of the few osseous characters which are common to all these animals. The condyle of the lower jaw is convex or flat, but never concave ; a character, says Professor Owen, which has proved extremely valuable in the determination of certain fossils.

Some few of the Mammalia are edentulous, as in the case of the true Ant-eaters, of the Pangolians or scaly Ant-eaters, and of the Echidna of Australia. In all the members of the present class, when the teeth are present they are limited in number, seldom being more than forty-four. The exceptions occur either amongst the aquatic species, or else amongst the lower organised forms which constitute the order *Bruta* of Linnæus. Thus, in the true Dolphins there are as many as one hundred and ninety teeth ; in the Spermaceti Whale there are upwards of sixty teeth ; while in the order *Bruta*, the Armadillo has ninety-eight teeth. In all these cases the teeth are small, subequal, and usually of a conical form.

In the majority of the class, the teeth assume special forms in different parts of the mouth, according to the duties which devolve upon them ; and hence arose the names of Incisors, Canines, and Molars, which have been given to them. These names are, however, now used in a more fixed and arbitrary sense. Thus, all teeth are termed Incisors which are implanted in the intermaxillary bones, and also those which correspond to them in the lower jaw. The tooth next to the incisors on either side is named Canine, as well as the corresponding tooth in the lower jaw, while all behind these teeth are known as Molars. There is, however, an important distinction to be drawn between these molar teeth, inasmuch as those which immediately follow the canine in the adult have been preceded by others ; these are termed Premolars, and correspond to the biscuspids of human anatomy. The true grinding teeth, which are placed behind these, are never preceded by any others, and once they are lost they are never replaced. These are the true molars, or molars properly so called.

In the previous classes there has been found to be a constant succession of teeth throughout the life of the animal, but this is no longer the case in the Mammalia. In none are teeth which are lost ever replaced more than once, while some have not even this limited power of restoration. With respect, therefore, to the reproduction and succession of these teeth, the entire class may be divided into those which produce a single set of teeth, and into those which form two sets of teeth. For the first of these Professor

Owen has proposed the term *Monophyodont*,* and for the second *Diphyodonts*.†

The Monophyodonts consist of the Ornithorynchus, Sloths, Armadillos, and the Cetacea: all the others are Diphyodonts. The teeth are implanted in separate sockets; and in the case of the molar teeth, the fangs are two or more in number, and have each a distinct socket for their reception; a character which is peculiar to the present class, and would serve at once to determine the nature of the animal to which any fossil tooth might have belonged which possessed these characters.

The substances of which these teeth are composed are usually three in number—viz., hard or unvascular Dentine, whch forms the greater portion of every tooth; of Enamel, which usually invests the exterior of the crown of the tooth, but which in some cases penetrates in folds into the interior; and lastly, of a thick substance, the Cement, which forms the outermost layer of all, and is usually thickest on the fangs. When, however, these folds of enamel penetrate into the crown of the tooth, they are also accompanied by a layer of cement. There are, however, several exceptions to this mode of construction, and again these occur in the Monophyodont series. Thus, the teeth of the Narwhal and Walrus consist only of dentine and cement, those of the Armadillo of dentine, while in the Ornithorynchus horn is substituted for dentine.

The Monotremata are peculiar to Australia and Van Diemen's Land; they consist only of two species of Echidna and of the Ornithorynchus. The first are edentulous animals, feeding almost exclusively upon ants, and perform the same office in this portion of our globe that has been assigned to the Pangolins in Asia and Africa, and to the Ant-eaters of South America.

The Orinthorynchus is an aquatic insectivorous animal, but feeds also upon water-snails, worms, and other small animals. There are four horny teeth in each jaw, the anterior of which are long, narrow, and cutting; while the posterior are broad, flat, and adapted for crushing.

The Marsupialia are mammalian animals, distinguished by possessing a peculiar pouch, formed by a fold of the abdominal integuments, which, in the males, contains the testes; while, in the female, it is inverted, covers the mammæ, and generally shelters the young for a certain period after their birth. With the exception of the Opossums, which are American, and the genus Cuscus, which is Malagan, all these animals are inhabitants of Australia, Van Diemen's Land, and New Guinea. In these regions they supply the place of those mammalian forms which are met with in other parts of the earth. Although the Marsupialia are thus limited and exclusive in their geographical distribution, they present as great a number of modifications of the teeth in relation to their habits and the nature of their food as the more numerous and extensively-spread group of placental mammals. Thus, from the nature of their food, some have been named the Sarcophaga, or Flesh-feeders, corresponding to the more ordinary Carnivora. The flesh-feeding Marsupials are, however, much inferior in size to the Lion or the Tiger, few of them exceed the Wolf in size, while the majority equal Weasels, Martins, and Stoats.

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* *Monos*, once; *phuo*, I generate; and *odous*, a tooth.

† *Dis*, twice; *phuo*, and *odous*.

The most typical and the largest animal belonging to this division is the Thalacinus; it is an inhabitant of Van Diemen's Land, and is about the size of a shepherd's dog. The dental formula in this animal is—

$$\text{Incisors } \frac{4\text{-}4}{3\text{-}3} \text{ Canines } \frac{1\text{-}1}{1\text{-}1} \text{ Premolars } \frac{3\text{-}3}{3\text{-}3} \text{ Molars } \frac{4\text{-}4}{4\text{-}4}\text{—}46$$

Others of the Marsupialia have been arranged together as the Entomophaga, and correspond to the Placental Insectivora; they constitute the most extensive and varied group of these animals. They feed, for the most part, upon the smaller and weaker class of invertebrate animals. The canines are much reduced in size to what they are in the previous division, and there is considerable diversity in the numbers and in the arrangement of the teeth.

One species, the *Myrmecobius fasciatus*, has a very remarkable dental formula, containing eighteen molars in each jaw, a greater number than is met with in any other diphyodont animal:—

$$\text{Incisors } \frac{4\text{-}4}{3\text{-}3} \text{ Canines } \frac{1\text{-}1}{1\text{-}1} \text{ Premolars } \frac{3\text{-}3}{3\text{-}3} \text{ Molars } \frac{6\text{-}6}{6\text{-}6}\text{—}54$$

In the other members of the group, the true molars do not exceed the usual number of four; but the teeth are frequently in excess of the usual number, in consequence of the animals having more than the ordinary number of incisors. This is exemplified in the dental formula of the Opossums, which is—

$$\text{Incisors } \frac{5\text{-}5}{4\text{-}4} \text{ Canines } \frac{1\text{-}1}{1\text{-}1} \text{ Premolars } \frac{3\text{-}3}{3\text{-}3} \text{ Molars } \frac{4\text{-}4}{4\text{-}4} - 50$$

Another group, the Carpophaga, contains animals which are vegetable feeders. In these the true molars remain the same in number as in the foregoing series, but the premolars and incisors are reduced in number. The incisors of the upper jaw are three instead of five, but they are increased in size, especially the first. In the lower jaw they are still further reduced in number, and seem to attain a proportionally increased size, so that in the Phalangers they resemble the large incisors of a Rodent animal.

The dental formula of the Phalangers is—

$$\text{Incisors } \frac{3\text{-}3}{1\text{-}1} \text{ Canines } \frac{1\text{-}1}{1\text{-}1} \text{ Premolars } \frac{3\text{-}3}{3\text{-}3} \text{ Molars } \frac{4\text{-}4}{4\text{-}4} - 40$$

The premolars are, however, very variable in number and size, except the first, which is placed next to the molars, and this may be the only one in place.

In others of the group, as the Petaurists, or Flying Opossums, the dental formula is the same as the above, and all three of the premolars are constantly in place.

A fourth division has received the name of Poephaga; the animals of which it is composed are the most strictly vegetable feeders. Amongst these creatures are those peculiar animals, the Kangaroos, in which the dental characters are all such as accord with its frugivorous habits; there are no canines, and the molars are marked by deep indented folds of enamel. The following is the usual, or, as Owen terms it, normal condition of the teeth in the Great Kangaroo, *Macropus major*:—

$$\text{Incisors } \frac{3\text{-}3}{1\text{-}1} \quad \text{Canines } \frac{0\text{-}0}{0\text{-}0} \quad \text{Premolars } \frac{1\text{-}1}{1\text{-}1} \quad \text{Molars } \frac{4\text{-}4}{4\text{-}4} \text{—}28$$

The fact is, that more premolars are developed, but some of them are speedily lost. In the Great Kangaroo the permanent premolar, which succeeds the corresponding deciduous one in the vertical direction, is pushed out of place, and shed by the time the last true molar has cut the gum; the succeeding true molar is soon afterwards extruded, and the grinding teeth may be reduced to two on each side of the two jaws by this yielding of the anterior ones to this *vis a tergo* of their successors. (Owen.)

The fifth and last division, the Rhizophaga, or Root-eating animals, contain animals in which the dentition assumes all the characters belonging to that of the ordinary Rodent animals; the canines are entirely absent, the molars are reduced in number, the incisors are only two in each jaw; they are broad, trenchant teeth, impinging against each other like those of the Hare or the Rabbit. Such a dentition is found in the heavy, sluggish arboreal animal, the Wombat:—

$$\text{Incisors } \frac{1\text{-}1}{1\text{-}1} \quad \text{Canines } \frac{0\text{-}0}{0\text{-}0} \quad \text{Premolars } \frac{1\text{-}1}{1\text{-}1} \quad \text{Molars } \frac{4\text{-}4}{4\text{-}4} \text{—}24$$

From the Marsupial animals the Lecturer then passed to the consideration of the teeth in the Placental division of the Mammalia, commencing with the Rodentia.

These animals contain the lowest organized of the Placental series. Some of them are exclusively vegetable feeders, as the Hares and Rabbits, while others, as the Rats, are omnivorous. All, however, are provided with two long curved incisors in the front of each jaw. The only exceptions to the above statement occurs in the family of the Hares, in which two diminutive teeth are placed behind the broad scalpriform incisors.

No canines are ever found in any Rodent. With respect to the molars, there are three modifications of them. In some, these teeth are rootless, and continue to grow throughout the life of the animal; such is the case in Hares, Chinchillas, Cavies, &c. In others, as the Beaver, Porcupine, &c., the molars have short, incomplete roots, which are developed at a late period of the animal's life; while the Squirrels, Dormice, Rats, and Jerboas have rooted molars.

These differences in the molar teeth are in direct relation to the nature of the food. The Rodents, which subsist on mixed food and are partly carnivorous, as the true Rats, or those which subsist on vegetable food, which produces less wearing of the teeth, and in which, therefore, less depth is required in the crown of the tooth in these, roots are formed for their firm implantation in the sockets of the jaws. The Rodents, which feed exclusively on coarse vegetable food, such as the bark, the wood, or the roots of trees, and in which the crowns of the teeth necessarily undergo a considerable amount of destruction—in these, the teeth either continue rootless throughout the life of the animal, or roots are developed towards the close of its existence, or at a period when the vital powers are beginning to diminish in its energies and reproductive powers.

These molar teeth are not numerous in any Rodent: in the Hare and Rabbit they are $\frac{6\,6}{5\,5}$; in the Lagomys or Tailless Hares, $\frac{5\,5}{5\,5}$; the Squirrels have $\frac{5\,5}{4\,4}$; the Dormice, Porcupines, Chinchillas, and Cavies, $\frac{4\,4}{4\,4}$; the Rats, $\frac{3\,3}{3\,3}$; but in the Australian Water Rat, Hydromys, there are only $\frac{2\,2}{2\,2}$ molars, making with the incisors in all twelve teeth, which is the smallest number which occurs in the Rodentia.

This difference in the roots is also accompanied with corresponding modifications in the arrangement of the dentine, enamel, and cement. Thus, in the Rats, or in those with roots, the crown is covered with a single layer of enamel investing the dentine; while in the molars of continuous growth and without roots, the body of the tooth has several folds of enamel, which press across its body, and produce an uneven surface, adapted for grinding or crushing the vegetable substances upon which these creatures feed.

The last animals which were noticed in the present lecture belonged to the order *Brata*, consisting of the Armadillos and the Sloths. The general characters of the teeth of these animals have already been noticed in the introductory remarks. Thus, there is little difference in their form or size, and in the Armadillo they are in excessive numbers, they are never developed but once, and hence the animals belong to the Monophyodont division of the Mammalia: in the Sloths they are few in number, and of a simple cylindrical form. In all the animals the teeth are rootless, grow throughout the life of the animal, and consist either of dentine alone, or of dentine and cement.

The concluding portion of the lecture was occupied with a description of the microscopic appearance which is presented by the teeth of the animals which had been described, and was further illustrated by numerous diagrams. In our report of the present lecture we have preferred delaying the account of the microscopic appearance until the conclusion of the fourth lecture, when a general and continued account of the microscopic structure of the teeth in all the Mammalia will be given as far as can be done without reference to engravings.

DR RICHARDSON'S LECTURES ON ANÆSTHESIA AND ANÆSTHETICS.

(Reported specially for the 'DENTAL REVIEW' by Mr JOHN DRISCOLL.)

LECTURE I.—TUESDAY, APRIL 24, 1860.*

ON SUBSTANCES CLASSIFIABLE AS ANÆSTHETICS.

DR RICHARDSON, after complimenting the College of Dentists on its progress, alluded to the fact of his having promised on the occasion of delivering a single lecture on anæsthetics last year, to give a course of lectures on the subject at some future time, a promise which he was now about to perform. He mentioned that this was the first course of lectures ever delivered in this country, or indeed in the world, upon anæsthetics. He commenced by defining anæsthesia as a process by which pain is removed, and anæsthetics as remedies which relieve pain and remove common sensibility. He mentioned that the term anæsthetics was now generally applied to those substances which produce insensibility by inhalation—volatile narcotics.

The knowledge of anæsthetics is of great antiquity. Some are of opinion that anæsthetic agents were used by the Egyptians, the Chinese, and the Hindoos : if they were, it is probable that the substances used consisted merely of seeds and structures of plants, such as hemp, which were burnt, and the fumes of which were inhaled. To those persons who wished to investigate thoroughly the history of anæsthetics, the first chapter of Dr Snow's work upon Chloroform and other Anæsthetics, and the papers of Dr Simpson, would be of interest. In this course the progress of anæsthesia, as a scientific history, would not be considered prior to the commencement of the nineteenth century, from which time to the present it is a very simple history. To Dr Beddoes was due the credit of undertaking the first experiments on the inhalation of gases. He had for a pupil Sir Humphry Davy, to whom we are indebted for the discovery that nitrous oxide gas (NO) when breathed by the lungs produces sleep. Sir Humphry Davy tried the experiment on various animals, and inhaled this gas himself. Sir Humphry Davy's account of his own sensations during this inhalation run as follow :—

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* [Since Dr Richardson's Lecture was delivered, we have read in the 'Dental Cosmos' the article entitled "Dr Wells the Discoverer of Anæsthesia." The evidence we consider is convincing, that to Dr Wells is entirely due the merit of having discovered the anæsthetic properties of sulphuric ether, and that neither Morton nor Jackson deserves any further credit than that of acting upon his (Wells') suggestion.—ED. D. R.]

"Having previously closed my nostrils and exhausted my lungs, I breathed four quarts of nitrous oxide from and into a silk bag. The first feelings were similar to those produced in the last experiment; but, in less than half a minute, the respiration being continued, they diminished gradually, and were succeeded by a sensation analogous to gentle pressure on all the muscles, attended by a highly-pleasurable thrilling, particularly in the chest and the extremities. The objects around me became dazzling, and my hearing more acute. Towards the last inspirations, the thrilling increased, the sense of muscular power became greater, and at last an irresistible propensity to action was indulged in. I recollect but indistinctly what followed. I know that my motions were various and violent.

"These effects very soon ceased after respiration. In ten minutes I had recovered my natural state of mind. The thrilling in the extremities continued longer than the other sensations. . . . . The power of the immediate operation of the gas in removing intense physical pain, I had a very good opportunity of ascertaining. In cutting one of the unlucky teeth called dentes sapientiæ, I experienced an extensive inflammation of the gum, accompanied with great pain, which equally destroyed the power of repose and of consistent action.

"On the day when the inflammation was most troublesome, I breathed three large doses of nitrous oxide. The pain always diminished after the first four or five inspirations, the thrilling came on as usual, and uneasiness was for a few minutes swallowed up in pleasure. As the former state of mind, however, returned, the state of organ returned with it; and I once imagined that the pain was more severe after the experiment than before."

The results of Sir Humphry Davy's experiments led him to suggest that—"As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place."*

As will be seen further on, the idea of Sir Humphry Davy was not acted on for nearly half a century, when new experiments having been commenced, a vast number of substances had been discovered. In the table before the Members the more important of these were classified and briefly described.

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* The book from which Dr Richardson read these extracts is the one entitled 'Researches, Chemical and Philosophical, concerning Nitrous Oxide,' by Humphry Davy. The passages will be found in pages 458-9, 464-5, and 556.—[J. D.]

VOLATILE ANÆSTHETIC SUBSTANCES.

Name.	Composition.	Physical Properties.	Preparations.
Nitrous Oxide	NO	A liquefiable gas, spec. grav. at 60°Ft. 1·525, taste sweet and sharp, a supporter of combustion, soluble in cold water.	By the action of heat on pure nitrate of ammonia.
Carbonic Acid	CO_2	A gas, but solidifiable ; spec. grav. at 60°Ft. 1·524, taste acid, inodorous, stops combustion, soluble in water.	By the combustion of carbon in oxygen, or by decomposing a carbonate.
Ether	C_4H_5O	A colourless liquid, spec. grav. at 60°Ft. 0·720, spec. grav. of vapour 2·675 ; air at 50°Ft. is saturated by 34 per cent. of ether vapour, at 60°Ft. by 46 per per cent. ; boiling point 96°Ft., tasteless, odour sharp and fruity, insoluble in water, inflammable in air.	By distillation of alcohol with sulphuric acid.
Chloroform	C_2HCl_3	A colourless liquid, spec. grav. at 60°Ft. 1·500, spec. grav. of vapour 4·2, boiling point 141°Ft. ; air at 50°Ft. is saturated by 8 per cent. of chloroform vapour, at 60°Ft. by 12 per cent; taste not sharp, but odour etherial and pungent, insoluble in water, soluble in alcohol, stops combustion.	By distillation of chloride of lime, water, and alcohol.

Name.	Composition.	Physical Properties.	Preparations.
Amylene	$C_{10}H_{10}$	A colourless liquid, spec. grav. at 60°Ft. 0·659, spec. grav. of vapour 2·45, boiling point 95°Ft.; air at 50°Ft. is saturated by 36 per cent. of amylene vapour, at 60°Ft. by 46 per cent.; tasteless, odour smoky and pungent, insoluble in water, soluble in alcohol and ether, inflammable in air.	By distillation of amylene alcohol with chloride of zinc.
Carbonic Oxide	CO	A permanent gas, tasteless, inodorous, insoluble in water, inflammable in air.	By the action of sulphuric acid on ferrocyanide of potassium with heat, or without heat on oxalic acid.
Fumes of Burning Lycoperdon giganteum	Undetermin'd (C.H.O.N ?)	A permanent gas, tasteless, stops combustion, insoluble in water and alcohol.	By the combustion in air of the fungus Lycoperdon giganteum.
Fumes of Burning Opium	Undetermin'd	A permanent gas, taste bitter, stops combustion, insoluble in water, slightly soluble in alcohol.	By the combustion of opium in air.
Olefiant Gas	C_2H_2	A gas, odour pungent like garlic, spec. grav. 0·981, inflammable in air, slightly soluble in water.	By the transmission of vapour of alcohol through sulphuric acid at boiling heat.
Dutch Liquid	$C_4H_4Cl_2$	A colourless liquid, spec. grav. of vapour 3·448, boiling point 180°Ft., taste sweet, odour etherial; soluble in water, ether, and alcohol; inflammable in air.	By the exposure of olefiant gas to the action of chlorine over water.

Name.	Composition.	Physical Properties.	Preparations.
Chloride of Ethyle, the Monochloretted	$C_4H_4Cl_2$	A colourless liquid, spec. grav. of vapour 3·420, boiling point 149°Ft., taste sharp, odour like chloroform, insoluble in water, soluble in alcohol.	By the exposure of muriatic ether and chlorine to the sun's rays.
Carburetted Hydrogen	CH_2	A permanent colourless gas, spec. grav. 0·559, inodorous, inflammable in air, insoluble in water.	By the action of heat on acetate of soda, hydrate of potassa, and quicklime.

Nitrous Oxide (NO)—or, as it is commonly called, laughing gas—is similar to air in its elementary composition, and it is worthy of notice that it is the only known combination of nitrogen and oxygen that produces insensibility: it is a supporter of combustion; this was proved by the experiment of putting a lighted taper into a jar of the gas, where it continued to burn with undiminished brilliancy. This gas is soluble in water, without losing its anæsthetic properties; this fact was also proved by a solution of the gas being poured into a vessel containing fish, the result of which was that the fish were completely narcotised. For many years this gas was used for experimental jest in chemical courses; but the idea of applying it for the removal of pain, as suggested by Sir Humphry Davy, was not carried out until December 11th, 1844, when Mr Horace Wells, a Dentist of Hertford, U.S., after seeing its effects, inhaled some of the gas previously to Dr Riggs extracting a tooth for him. Mr Wells' comparative immunity from pain during the operation led him to exclaim, "A new era has taken place in tooth-pulling;" but, from the uncertainty of the effects of this gas, he was compelled, after repeated experiments, to give up its use almost in despair. The uncertainty of its effects cannot be accounted for: we may take two animals from the same litter, and, as far as we can judge, exactly resembling each other in constitution; yet, on subjecting them to the influence of this gas, we may find that one is quickly rendered insensible, while little effect is produced on the other. But another and greater argument against the use of this anæsthetic was, that animals under its influence rapidly die, unless great vigilance is used in watching the result. Dr Richardson then proceeded to subject a Guinea pig to the influence of this gas; and in this case the uncertainty of its effects was fully shown, as it produced very little effect upon the animal.

Carbonic Acid (CO_2), the second substance named in the Table, is what is termed a negative anæsthetic; it was first suggested about the year 1823 by an English surgeon. In some parts of the world it is exhaled from the earth, as, for instance, in the Grotto del Cane in Naples, in which cavern the guides, for the purpose of amusing visitors, are in the habit of placing dogs until the animals become narcotised. This anæsthetic exhibits great differences from nitrous oxide, and has the power of arresting combustion; this was illustrated by a lighted taper being placed in a jar of this gas, when the flame was immediately extinguished. As an anæsthetic, carbonic acid has no property whatever to recommend it; its administration is always attended with great danger to the patient, and it is frequently productive of fatal results when administered to animals. In the experiments that have been made with this anæsthetic, the period of insensibility produced has been found to be very limited, and its effects may be described as similar to the garotte, as it produces insensibility by simply stopping the respiration. Dr Richardson illustrated the narcotising effects of this gas by an experiment on a Guinea pig. The animal was speedily reduced to a state of insensibility; but on being removed from the influence of the gas immediately after the desired result had been obtained, it soon recovered its normal condition.

Ether (C_4H_5O)—synonym, sulphuric æther—was next taken into consideration. It is questionable who first had the honour of introducing this as an anæsthetic; in fact, the famous Morton and Jackson controversy on the point of priority must still be familiar to many listeners. From what we can understand, it seems that Morton first discovered the narcotising properties of sulphuric ether, but tried to make a mystery of his labours—a circumstance that may be considered as bordering upon charlatanry. He also had several conversations with Dr Jackson about nitrous oxide, and during one of the conversations he (Morton) says that he mentioned his discovery to Dr Jackson: this, however, is contradicted by the latter gentleman, who claims all the honour and merit of the discovery for himself.* When ether was first brought out as an anæsthetic, it made rapid progress, and then declined. Mr Robinson, the Dentist, was the first to apply it in this country; but, through the clumsiness of the apparatus which was used in earlier inquiries, operators were not generally successful. The whole subject was ultimately simplified by Dr Snow. In the inhalation of ether, a large volume of vapour is taken into the lungs, and there is great cold given off from it when evaporated from an open surface. Dr Snow showed that it required to be inhaled over a large surface. There have been a variety of apparatus invented for the inhalation of ether; but a hollow sponge will answer all the purposes, and is quite satisfactory. Dr Richardson then proceeded to show the effects of ether vapour upon a dog, speedily reducing the animal to a state of insensibility, from which he afterwards recovered, protesting loudly and emphatically, after the manner of his kind, against the treatment he had received. Ether boils at the temperature of the body; it is tasteless, but has a sharp, pungent odour; and although it is inflammable, it arrests combustion. This last property being dangerous to prove anywhere out of a laboratory, was not on this occasion experimentally illustrated.

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* See Note at commencement of Lecture.

Chloroform (C_2HCl_3) has received many names—such as, perchloride of formyle, chloroformyl, &c.,—but eventually it has obtained by common consent the name of chloroform. It is at present our readiest anæsthetic, from the rapidity of its action, and of recovery from its effects, and the completeness of the insensibility it produces. It is somewhat similar in composition and properties to ether; in fact, it was the discovery of ether that set many observers to work to introduce another and more perfect anæsthetic. Dumas, Guthrie, Liebig, and many others, had made chloroform; but Professor Simpson was the first to apply it on the human subject. This substance is usually administered in quantities of two or three drachms. It is insoluble in water, but soluble in alcohol; it is not a negative, but a true anæsthetic. It differs from nitrous oxide, in that it arrests oxidation and combustion; this was proved by extinguishing a lighted taper with its fumes. A dog was placed in a glass case, and exposed to the vapour of this anæsthetic, which soon rendered him perfectly senseless.

Amylene ($C_{10}H_{10}$).—This anæsthetic was introduced by Dr Snow; it has a smoky and pungent odour, and in some cases is preferable to chloroform; but at present there is no way of preventing impurities from getting into it in its manufacture; which impurities may cause great danger in its use. If we could get it pure and mix it with ether, the mixture would form perhaps the best anæsthetic ever introduced; for although amylene is longer in producing an effect than chloroform, it does not interfere so much with the functions of the sensory organs, the patient sometimes remaining conscious under its influence. In one case where this anæsthetic was administered, and the foot of a child removed, during the whole time of the operation the child was playing with a ball, quite insensible to pain, but conscious. Dr Snow administered it to between 200 and 300 patients, two out of the number dying from its effects: he also subjected between 300 and 400 animals to its influence. Dr Richardson has experimented upon some 30 or 40 animals, with varying results, owing to the different quantities of impurities contained in different samples of amylene. Dr Richardson stated, that in his Table he had put down the boiling point of amylene as 95° Fahr., that being the boiling point of Bullock's specimen; but some that he had from Paris required 110° Fahr. to boil it. Dr Richardson then showed the narcotising effects of amylene upon a dog with complete success, and concluded his first lecture with this experiment.

ACTION FOR LIBEL.

COURT OF SESSION—(SCOTLAND).

(Before the Lord President.)

MORRISON *v.* THE 'BRITISH JOURNAL OF DENTAL SCIENCE.'

THE following action for defamation, embracing points of considerable general as well as local interest, was tried a few days ago in the First Division before the Lord President and a jury. The pursuer was Mr James D. Morrison, Surgeon-dentist, Edinburgh, and the defender Mr John Churchill, publisher of the 'British Journal of Dental Science,' London.

The following was the issue submitted to the jury :—

" It being admitted that the defender is publisher of the journal published in London, entitled 'British Journal of Dental Science :' It being also admitted that in the 'British Journal of Dental Science' for November 1858, there was published an article, entitled 'Dental Puffing,' containing the words and statements set forth in the schedule hereto annexed :—

" Whether the said words and statements, or part thereof, are of and concerning the pursuer, and falsely and calumniously represent him as an unworthy and unprincipled person, as one who, as a professional man, lies in wait and attempts to take unfair advantage of credulous persons, and as a person who indulges in malpractices highly detrimental to the respectability of the profession to which he belongs, to the loss, injury, and damage of the pursuer."

Damages were laid at £1,000.

The following extract from the article referred to was appended to the issue :—

" Whatever may be the claim of electricity to be considered an available anæsthetic in dental surgery, its introduction will at least have served one good end—namely, that of unmasking certain individuals in the profession, who lay in wait for an opportunity of attracting public notice, by identifying themselves with any new discovery that turns up. When such occurs, they rush into the public journals, and that without having anything particular to say on the subject, further than that they are so and so, and that they live at so and so. (They are particularly careful to afford that interesting piece of information.) Having thus, to their own satisfaction at least, established their identity with the novelty, their next move is a discharge of complimentary paragraphs, under cover of which the grand assault on the credulity of the public is made in the shape of a puffing advertisement, setting forth their claim to originality of invention—to success in operating beyond the powers of credibility—and to prescriptive rights by means of patent. Such malpractices being highly detrimental to the respectability of the profession, we feel but indifferently disposed to mince our words in dealing with such cases as may come under our notice.

" The system of appealing to the public by means of advertisements, is admitted to be utterly repudiated by all who do enjoy or aspire to a position in the Dental Profession, and that be the appeal ever so modestly made. What then shall we say of those who hold out a bait wherewith to lure the simple-minded by promising immunity from suffering, and seek to mystify by the use of high-sounding but nonsensical terms ?

" A case has been brought under our notice, which we shall lay before our readers, forbearingly suppressing name and locality. But be it kept in mind, that we do so more from a feeling of delicacy towards the local professionals, who feel sadly scandalised by the affair, than from any consideration the offending party could reasonably claim at our hands.

"Having made his *début*, in the first place, in a metropolitan paper, and transferred his astounding communication to the local journals, the party to whom we refer follows it up by an advertisement headed 'Painless Dental Surgery,' in which he announces himself as the discoverer and patentee of 'Electro-Aerial Anæsthesia.' (!) Now, as to the title, we shall merely denominate it a misstatement, although, under the circumstances, we should be warranted in making use of a stronger term. Electro-magnetism may favour the patient in some instances, but it is at best but an uncertain agent to employ, so far as observation has hitherto gone. Then as to the 'Electro-Aerial Anæsthesia,' can any one of our intelligent readers afford us a definition of the term? What does it mean? and of what is the party the discoverer and patentee? Of electricity? Certainly not. Of aerial anæsthesia? Taking it to be a physical condition—can such be patented? Common sense says no. The means by which that effect is produced may be patented, but assuredly not the effect itself. If correct in our premises, then is the term but a tissue of nonsense, calculated only to astonish the ignorant and entrap the unwary.

"Be that as it may, however, the *animus* has still to be disposed of—the desire to patent the means of ameliorating pain, and so impose a restriction on the exercise of humanity. An act so unworthy requires no comment."

Counsel for the Pursuer—Mr Young and Mr Gifford. Agent—Mr W. S. Stuart, S.S.C.

Counsel for the Defender—The Solicitor-General and Mr A. B. Shand. Agent—Mr John T. Mowbray, W.S.

Mr Gifford proceeded to open the case for the pursuer, by explaining the part which Mr Morrison had taken in improving Blundell's patent, and advertising the fact. He then referred to the article complained of, and, pointing out that it was intended and even admitted to refer to Mr Morrison, he contended that it was calculated, intended, and actually did, effect great injury to him. The defender had, he said, declined to give up the name of the writer of the article, thereby taking the responsibility of it on himself, and he had refused to apologise or retract, so that the pursuer, finding he was seriously prejudiced by this article, had found it necessary to bring this case before a jury for redress.

Mr Morrison, the pursuer, was the first witness called. He described his various processes for rendering the extraction of teeth painless, by means of the application of cold to the gums, and related the circumstances of his having operated upon Dr Robson, Master of the Western Institution; Dr Small, Army Surgeon, and others. He stated that he submitted his process to the Royal Scottish Society of Arts, who appointed a Committee to examine it, of which Dr Newbigging was convener, and Professor Simpson and Mr Bryson were members. Professor Simpson was unable to attend, but he operated on a lady and gentleman in presence of Dr Newbigging and Mr Bryson, who gave a favourable report to the Society. A medal and prize were awarded to him by the Society. The medal bore to be given "for the ingenious mechanical arrangements in his apparatus for the application of cold for producing local anæsthesia." Witness then deponed to having advertised on several occasions in the local journals, and said it was not at all an unusual thing in his profession to advertise, and that he believed all the Dentists in Edinburgh were in the habit of advertising, except, perhaps, two, of whom he was not sure. He then identified a series of letters which had been published in the 'Scotsman' relative to his mode of operation—first, a letter by Dr Smith, dated 23rd September; second, a letter by Dr Robson, signed "A Grateful Patient," and further letters by the same parties; and then an anonymous letter, which was answered by himself. After the correspondence in the 'Scotsman,' this article appeared in the 'British Journal.' He felt this article had been very injurious to him in his profession, and it had also been very painful to his own feelings.

In cross-examination by the Solicitor-General, witness claimed the whole of his processes as his own discovery. He had, he said, introduced Mr Blundell's patent into his practice, and had purchased the exclusive right to use it in Edinburgh; but he used it in a different way, applying it to the sides instead of the crown of the teeth. He used various processes, more or less perfect, to produce local anæsthesia in the extraction of teeth. The process submitted to the Royal Society, and used in Robson's case—namely, metallic chambers fitted to the gums—was the most effectual. The expense of extracting one or more teeth by that process might vary from one guinea to ten; the charge varied according to the position of the tooth in the jaw, and the quantity of silver required. Witness went on to depone—I did not see the report of the Royal Society's proceedings before it was inserted in the papers, but I had seen the report of the Committee. Mr Beatson Bell gave me a copy of the Committee's Report, in order that it might appear the following day. In the Committee's Report, they stated that they were of opinion that I could not lay claim to the originality of the suggestion as to the application of cold to produce anæsthesia; but that was the suggestion of which they so spoke, not the practice. Dr Arnott, who had made the discovery, used cold as a therapeutic, not as an anæsthetic, agent. I am not a member of the Odontological Society in this city. I know they have a rule against advertising their qualifications; they have also a rule against any member possessing a patent. I am a member of the College of Dentists of England. They have a rule against disreputable advertising.

Re-examined by Mr Young.—The use of the silver chambers is always attended with perfect success. I have never failed with them; it is impossible to fail. In that process the plate requires to be made to fit the gums of the patient, and a plate is made for the particular individual. Two plates are required—one for the inside, and one for the outside. The modelling of the mouth, and the making of the plate, is the great expense attending the perfect method; and it is rarely resorted to unless a number of teeth are to be extracted at once. I used the process yesterday for the extraction of one tooth, but that is rarely done. I have another process where patients cannot afford the delay and expense of applying the other. It is also patented. It is an india-rubber bag with double action, through which the cold fluid is sent instead of through the chambers. It is much cheaper, and more speedily prepared; but it is less perfect, though, according to my experience, the pain is greatly alleviated by that method. There are some cases in which I have not gained any success by these methods, but these are the rare exceptions.

Professor Simpson.—I have known the pursuer ten or twelve years. I am acquainted with his various methods of applying cold to the teeth for the production of local anæsthesia. I saw the chambers applied in the case of Dr Robson in September 1858, and I believe it was thoroughly successful. I doubted the possibility of it, but was convinced of it by its complete success. I saw from examination that the gums were completely frozen and benumbed, and the patient stated at the time that he experienced no pain. I also saw it applied in the case of Dr Small, which was still more satisfactory, from the explicit manner in which, being a medical man, he described the effect of the operation on himself. I have seen Mr Mein, Mr Spence, and other very respectable dentists advertising. Medical men are constantly in the habit of advertising books. The expense of Mr Morrison's process of the application of cold by chambers is the only drawback, but I think some means may yet be found to lessen the expense.

Cross-examined.—I discovered chloroform as an æsthetic agent. I did not advertise it, but I published a book on the subject. Congelation to produce anæsthesia in india-rubber bags was known before, but Mr Morrison's process was new in this respect, that whereas caoutchouc bags were constantly breaking, he fitted metallic chambers to the gums, through which the cold fluid should run. He made certain what before was comparatively uncertain.

Mr Newbigging.—I was convener of the Committee of the Royal Society who reported on Mr Morrison's processes. Mr Bryson examined the apparatus with the metal chambers, and saw it applied in two cases. The operations were perfectly successful in both cases. We gave in a report to the Society, and Mr Morrison had a medal and prize awarded to him. We were satisfied with the principle of his process, and we thought the application of it ingenious and successful. The thing new in Mr Morrison's process is the means of applying congelation to the gums. I cannot say I have seen many advertisements by dentists in Edinburgh, but I have seen some by very respectable dentists.

Cross-examined.—It was the apparatus we thought was new. Dr Arnot's principle of applying cold was the same, but the use of metal chambers to produce congelation in the gums we believed to be novel.

Dr Alexander Simpson, Mr Bryson, Dr Thomas Robson, Dr Gray, and Dr Schmitz, all bore testimony in favour of the pursuer as an honourable and skilful Practitioner; after which,

Mr A. B. Shand then proceeded to open the case for the defender. He first referred generally to the article in the 'British Journal of Dental Science' complained of, and contended that its terms, when fairly construed, did not bear out the meaning which the pursuer attached to them, and did not amount to more than fair comment and criticism on a system of puffing which was considered to be derogatory to the members of a respectable profession. It had been admitted that the writer of the article did allude to the pursuer; but when the article was brought under the notice of the defender, he at once denied the slightest intention to cast any imputation on the pursuer's moral character, or to question his professional skill and integrity.

Mr J. W. Davis was then called, and deponed—I have been clerk to Mr Churchill for upwards of twenty-five years. We send five copies of the 'Journal' direct to Scotland—one to Edinburgh, one to Aberdeen, one to Inverness, and two to Glasgow. The copy sent direct to Edinburgh is addressed, so far as my memory serves me, to Dr Reid, Heriot row. I don't know whether he writes in the 'Journal' or not.

This closed the case for the defender.

Mr Young then addressed the jury for the pursuer in an able speech, and the Solicitor-General having replied thereto on the part of the defender,

The Lord President, in summing up, said he would make only a few remarks to direct the attention of the jury to what was really the point at issue between the parties at the bar. The question with which they had to deal was simply whether the article which appeared in the 'British Journal of Dental Science' on the date libelled was of the character alleged by the pursuer in the issue. It appeared that the pursuer was a gentleman established in business as a dentist in Edinburgh, and that he had applied his mind particularly to the discovery of more perfect means than existed of extracting teeth without pain to the patient, and, so far as they had evidence, he appeared to have been tolerably successful. He was not the first person who had thought of the same thing, or that had partly accomplished it; but he applied his mind to the subject, and invented certain improvements in the mode of applying those means which had been previously thought of, and he obtained a patent for those improvements. He announced his profession, and the nature or effects of his invention, by means of advertisements in the newspapers, and upon that arose a newspaper discussion on the matter, in which the pursuer and others took part. After that discussion the article appeared of which the pursuer complained in the present action. The pursuer averred in the issue which they were now trying, that that article represented him as "an unworthy and unprincipled person, as one who, as a professional man, lies in wait and attempts to take unfair advantage of credulous persons, and as a person who indulges in malpractices highly detrimental to the respectability of the profession to which he belongs. Now, if the article did all that, there could be no question that it was a wrong and injury to the pursuer, and that he was entitled to redress; and the question for the jury to consider was just, did it do so, or did it not? A public journal was certainly entitled to comment upon passing events of the day interesting to the public, or to a particular profession or other branch of the public; and the public often derived advantage from journals pursuing that course, in the repression of much that might be wrong and injurious, and the encouragement of much that might be useful. It was by discussion of that kind that truth was often elicited, and important advances made in many departments of science and art. Dental surgery, as it was now called, was a matter interesting to a large portion of the public, and discussions on that subject were quite proper to be dealt with by a public journal, and especially by a journal devoted to the interests and concerns of that particular profession. Any discovery which, whether by simple or complex means, effected either an amelioration or a total cessation of that pain which had hitherto been incident to the extraction of teeth, was a matter of interest to the profession, and was therefore a fit subject for comment and discussion in the 'Journal of Dental Science.' In the present case, it appeared that the discussion did not originate in that journal. There had been previous discussions in the 'Scotsman' and the 'Times' on the subject; and the matter was in that position when the 'Journal of Dental Science' took it up, and published the article now under review. Had that article confined itself to general criticism and remark upon the alleged discovery or invention, neither the pursuer nor any one else would have had any cause to complain. But if, on the other hand, that journal, transgressing the bounds of mere criticism, went into personalities injurious to an individual, or made attacks upon an individual which it was not prepared to justify in a court of law, then undoubtedly that journal had transgressed, and was responsible for the consequences. After some further general remarks to the same effect, the Lord President went on to say—The first portion of the article, as had been noticed by the Solicitor-General, was of a general character ; but its general remarks appeared evidently to be made for the purpose of preparing the way for what was to follow. It began by saying, " Whatever might be the claim of electricity to be considered an available anæsthetic in Dental Surgery, its introduction will at least have served one good end—namely, that of unmasking certain individuals in the profession who lay in wait for an opportunity of attracting public notice by identifying themselves with any new discovery that turned up." That was an announcement, in the first place, that there were persons who lay in wait in that manner, and who required to be unmasked. Then it went on to say what these persons did. They not only lay in wait to attract public notice, but after that notice had been attracted, " they rush into the public journals, without having anything particular to say on the subject," except to give publicity to their names and places of abode. Having by this means (the article proceeded) " established their identity with the novelty, their next move is a discharge of complimentary paragraphs, under cover of which the grand assault on the credulity of the public is made in the shape of a puffing advertisement, setting forth their claim to the originality of invention, to success in operating beyond the powers of credibility, and to prescriptive rights by means of patent." A great deal had been said by the learned counsel on both sides about " puffing advertisements," and they had had quotations from the rules of two institutions in London directed against the practice, but he had not heard any very intelligible definition of the point—What is a puffing advertisement ? Even in the article itself all advertisements did not seem to be denounced as disreputable, but only " puffing advertisements ;" and if the matter had remained there, without going into particulars by way of example, or dealing with particular persons, there could have been no objection taken to it. But the article next went on—" Such malpractices being highly detrimental to the respectability of the Profession ;" that was strong enough language, but still, according to his judgment, it was perfectly fair as a general statement or criticism. If a journal believes that there are persons who lie in wait to attract public notice by identifying themselves with new discoveries with which they have no connection, and who discharge complimentary paragraphs regarding themselves for the purpose of imposing on public credulity, it was perfectly entitled to say that such a practice was detrimental to the respectability of any profession. But the writer next went on to say more broadly —" The system of appealing to the public by means of advertisements is admitted to be utterly repudiated by all who do enjoy or aspire to a position in the Dental Profession, and that be the appeal ever so modestly made. What, then, shall we say of those who hold out a bait wherewith to allure the simple-minded by promising immunity from suffering, and seek to mystify by the use of high-sounding but nonsensical terms ?" The first of these sentences stated a matter of opinion, not quite consistent, however, with all that they had heard that day ; but with regard to the second, he would say that the more what it described was done, the more was the journal entitled to denounce the practice. But then came the second part of the article, and it was a question for the jury to decide, whether in that portion all the strong expressions that had gone before were pointed against and applied to the pursuer. It was for the jury to consider whether the writer stopped at that point, and then went on with a new division of his article, unconnected except in a general way with what went before ; or whether he did not say —" Here we have found just such a man as we have been describing, and we are going to unmask him." The writer went on to say—" A case has been brought under our notice, which we shall lay before our readers." Did that connect the case to follow with the system which had been so properly denounced in the portion going before, or did it not ? Having read over the concluding portion of the article, his Lordship said they had been told that the whole meaning of it was the title "Painless Dental Surgery" was a misstatement or an absurdity, and that the " electro-aerial anæsthesia" was merely a condition, and that therefore to speak of it as a discovery, and say it was patented, was a tissue of nonsense, and that was all. If that had been all, in the opinion of the pursuer, then there would have been no complaint ; for he did not complain that he had been accused of writing nonsense, or of advertising an absurdity ; what he complained of was, that he was represented in that article in the terms embodied in the issue, " as an unworthy and unprincipled person, as one who, as a professional man, lies in wait and attempts to take unfair advantage of credulous persons, and as a person who indulges in malpractices highly detrimental to the profession to which he belongs." That was what they were to look for in the article. And they must bear in mind that it was not necessary to find all the identical words there ; it was enough if they found substantially the things represented, however the words might vary. They had nothing to do with the question of the success of the pursuer, or of the value of his discovery ; or the question whether he did most of his work by means of electricity or by cold water tubes ; but they were solely to consider the averments in the issue. If they found these not contained in the article appended, they should return a verdict for the defender ; but if they found that they were contained in that article and applied to the pursuer, their verdict should be for the pursuer. Only if they came to the latter conclusion would the question of damages arise ; but in dealing with that question they should not fail to consider that the defender had, at an early period of the correspondence, offered to publish a certain kind of explanation and reparation, to the effect that the article was not meant to reflect on the pursuer's moral or professional character.

The jury then retired, and after an absence of about twenty minutes, returned to Court and announced that they unanimously found for the pursuer, with £100 damages.

The proceedings attracted considerable interest, and the announcement of the verdict was received with general cheering.

FRESCO *v.* MAY.—Within the last month an action was brought by Mr A. Fresco against Mr Bowen May. It appears that some months back Mr. May was employed as attorney in a case against Fresco, and that he (May) published an article in the 'Medical Circular' on the subject, in which it was stated, amongst other things, that Fresco made use of Mr Cock's name in his advertisements without that gentleman's consent. Subsequently it was shown that Mr. Cock had given a certificate to plaintiff, but had forgotten the circumstance. Mr May had not, however, made this fact public in the 'Medical Circular,' and Mr Fresco's counsel alleged that the latter had suffered considerably in his practice in consequence.

A verdict in favour of Fresco was recorded, with £450 damages.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—Will you allow me, through the medium of your pages, to caution the Dental Profession against an Assistant of the name of Henry Orme, late of Newman street, London, who is travelling through the country, calling upon Dentists soliciting work? The above individual called upon me on the 14th of July for employment, and having (through a recommendation from a respectable firm) employed him once before, I took him in, commiserating his condition, as from his appearance he seemed to be (as they say) "very hard up." Having to make my usual visit to a neighbouring town on the 16th, I found on my return that he had decamped, and "stolen" gold cuttings and filings to the value of nearly 3*l*., besides an over-coat hanging in the lobby, through which he passed out.

My object in wishing you to insert the above is to prevent him robbing any one else who may have the misfortune to employ him. He stands about five feet, of light complexion, wears a blue pilot or beaver cloth coat with breast-pocket outside, and a black tommy hat.

Yours truly, J. M. SLATER.

Hanley, Staffordshire, July 23, 1860.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

DEAR SIR,—I shall be obliged if you will allow me, through your next number, to inform my Professional brethren, especially those resident in the Provinces, from whom I am frequently receiving communications on the subject, that I am at all times glad to answer such inquiries, and to receive such suggestions as relate to the use and practical capabilities of the Dental Operating Chair introduced by me; but I beg that it may be distinctly understood that I have no pecuniary interest whatever in the sale of it, and that all questions with respect to cost, &c. &c., should be addressed to Messrs C. Ash and Son. They have established a manufactory expressly for this Chair upon their own premises, where it is made in large numbers under their personal supervision, so that they are in the best possible position for consulting the interest and the requirements of the Profession in every way with respect to it. The very admirable manner, too, in which they have carried out every detail of construction and finish, &c., entitles them to my highest commendation, so that I am altogether disinclined to interfere with their interest in it.

I am, dear Sir, yours obediently,
GEORGE OWEN.

Islington, July 12, 1860.

All communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," at the Publisher's, Mr H. BAILLIERE, 219 Regent street, W., NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

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BOOKS RECEIVED.

The Dental Cosmos for July (in exchange).
Dental Register of the West for July (in exchange).
American Medical Times, No. 2 (in exchange).
Revue Odontotechnique for July (in exchange).
L'Art Dentaine for July (in exchange).

THE

DENTAL REVIEW.

SEPTEMBER, 1860.

MEDICINE AND DENTISTRY; THEIR RELATIONSHIPS AND DISTINCTIONS.

It has answered the purposes of political party sophistry to attempt over and over again to impute to the supporters of an independent College for Dentists, the sin of trying to make the education of Dentists subservient to the establishment of the independent institution. There can be no doubt, too, that to a certain number of persons, standing outside, this sophistry has had its influence. We see it, indeed, every now and then creeping forth from publicists who could not for a moment, if they knew the whole truth, be guilty of serious error against men who, firm in their convictions of right, have least of all offended against either justice or progress.

As an illustration of the mode in which attacks are, by a side-wind, made against the independent Dental movement, we find our contemporary the 'Lancet' taking advantage even of the review of a book, to throw a stone at an institution which, like the 'Lancet' itself, was started to remedy great evils, and to proclaim perfect liberty of action to every man, untrammelled by the fetters of corporate influence, and the pride of an assumed superiority.

It will be fresh in the memory of our readers that, twelve months ago, Dr Richardson delivered a series of Lectures before the College of Dentists on the "Medical History of Diseases of the Teeth." These Lectures, after being printed in the pages of this 'REVIEW,' were struck off in a separate form, and have been published in a distinct volume. The 'Lancet' reviews this volume, and in speaking of the book is very fair in its remarks. But, unfortunately for his own knowledge or fairness on this subject, the reviewer in his last sentences chooses to be the echo of the sophistical parties who have, though he may not, a political motive behind their sophistry. There is, inculcates this writer, one aspect of the book which requires attention. The advocates of a Dental College have lately, he continues, laid great stress on the probable injury to Medical Practitioners which would result from the new examinations in Dentistry instituted by the College of Surgeons, alleging that the new candidates will be possessed of information which will enable them to prescribe medically in cases not requiring operative interference. The suggestion—so runs on the argument—comes with a peculiarly bad grace when it is accompanied by a series of lectures such as these delivered by a distinguished physician, ably dealing with the medical aspects of the diseases of the mouth, tracing their constitutional relations, and discussing the merits of the salts of iron and quinine, and the indications for tonics, alteratives, and alkalies. "These therapeutic instructions and medicinal formulæ," adds the reviewer in a farewell sentence, "are obtained by the Council of the College of Dentists for a class of persons who have no medical right or qualification whatever, and who would be as little justified in prescribing them as any counter-chemist in the kingdom."

Setting aside this uncalled-for insult against respectable members of a respectable calling; setting aside also the incorrectness of the statement that set formulæ for prescribing are given in the work which the reviewer has been commenting on; setting these both aside as too transparent to require illumination, we would correct, rather, the general impression which the above carefully-covered argument tries to convey.

In the first place, the reviewer himself, and all who go with him, in giving support to the Certificate system of the College of Surgeons, admit the propriety of separating Dentistry from Medicine by a certain distinct line. If not, why a special form of examination and a distinct board? We, too, go in for the division of Dentistry from Medicine by a distinct line. We do so logically and consistently: we say that the occupations of the Dentist *per se* are sufficient for the labour of any one man; we say that any one man who has professional work at all, who should try to add to the Dental work that of any other pursuit, however closely allied, would fail as a Dentist, fail in practical manipulation, and fail also in judgment as to the most expedient course to be pursued in each varying case that should come before him. Lastly, we say that the duties for which the whole skill and temper of the practising Dentist are demanded during his working hours are peculiarly special, and, partly scientific and partly artistic, form in themselves a practice as determinate as the pure science of chemistry is distinct to the chemist, or the practice of law is distinct to the barrister.

If there is any one bold enough and clever enough to prove that this specialty of Dentistry does not exist, we will give up the ground altogether. Meanwhile, having not a single challenge before us, we may go on.

Dentistry, then, being a separate profession, according to the practice if not to the letter of those who live by it, we are naturally led to ask how it shall be represented and organised as a profession. We say, by an independent brotherhood. Our reviewer above, and those for whom he speaks, say no ; not as an independent brotherhood, but as connected with a College belonging to a profession which, on its side, is entirely separated from ours according, not only to the *practice*, but to the *letter* of the majority of those who live by it. The position, therefore, of these argumentatists comes simply to this : that, admitting a scientific, and practical, and daily distinction between two professions, they try to make the weaker the vassal of the stronger, against the feeling and the expression of the majority of both. We, on the other hand, urge that the scientific and practical separation carries with it, logically and all-powerfully, the political separation also.

Looking at the matter deeper still, see again how illogical the proceedings of the advocates of the annexation principle are. Their plan, it will be observed, does not even attempt to link us with medicine altogether, but with a specialty of medicine through another special channel. The College of Surgeons is a specialty, in a higher degree truly, but in fact almost as definite as our own ; so that any connection that might exist between ourselves and that College is a mere nominality. It may give us the opportunity of adding some one or two letters to our names, such as C.D.R.C.S.—Certificated Dentist of the Royal College of Surgeons ; but to link us truly to medicine, the medical qualification must be in full ; it must not be either the mere qualification of a Surgical or Medical College, but must carry a double connection, a medical as well as a surgical recognition. Were we partisans of the annexation scheme, we should, to be consistent, at least insist on such full annexation. If the College of Surgeons gives us one wing to protect us, we would certainly get the College of Physicians to give us another ; for the diseases of the teeth have a medical as well as a surgical aspect. But we think it best, asking for no wing at all, to stand on our own ground, and make our own men.

Far be it from us, at the same time, to suggest, as is suggested for us, that thereby we would cripple education, and give to the world men who have no knowledge beyond the bare fragments of a trade. Whoever accuses the independent body of Dentists of this, does so in the face of opposing facts as open as the day. The advocates of an independent College know and assert that a man cannot be too well informed to practise Dentistry. The advocates of this movement have never urged that the candidates for the College of Surgeons' special certificate would have *too much information*, but, on the contrary, that these might make claim to Medical rights as well as to Dental distinction, and that aspirants might be thrown on the community who, neither properly educated to Dentistry nor to Medicine, could assume the paternity of both. That this is the right estimate, time will discover.

The relations of Medicine and Dentistry are clear. They are two professions, but one may be learned in the other. The barrister standing to plead in a matter of life and death, is none the worse, we think, the more he understands the relations of health and disease, and the whole medical aspects of the case before him. For all that, it is not needful that a barrister should have, what the whole bar would unite in opposing, a certificate from the College of Surgeons. The physician undertaking a medical case in which disease of the teeth is evident, would surely be all the better man if he knew so much of the principles of Dentistry as to enable him to discover what would be the best operative course to be followed: but is this any valid reason why he should go up to a College of Dentists for a special certificate? That we cannot conceive. In like manner, the Dentist is all the better man if, without practising physic, he can appreciate every case brought before him, in its surgical, its medical, and its physiological, as well as its operative aspects; but that is surely no reason why he should stand on a professional basis not his own, but borrowed from a neighbour.

Let the Dental Profession ponder on these facts. Let them thank a College which, maintaining the principles of unity and brotherhood on the one hand, is free to offer to its members the best and most comprehensive instruction on the other. Let them at this critical time, when professional opinion is divided on right and wrong, rally round and give full help to the only representative Dentists' Institution—the only one that can prevent English Dental Science from sinking into a servitude to which, so long as it is submitted to, hope, progress, unity, and peace are each and all equally and wantonly sacrificed.

We cannot conclude this notice without mentioning the gratification we feel in announcing in the present number the fact that the College of Dentists, strong in its faith in the future, has taken a permanent stand, and is determined to continue on in its useful course, offering a representative and catholic union to all who choose to join in the design of giving to the Dental Profession a scientific position and an independent political organisation.

DENTAL SURGERY AND MECHANICS.

CASE FROM DENTAL PRACTICE.

BY J. FOSTER FLAGG, D.D.S.

(From the 'Dental Cosmos' for August.)

Mrs W., bilio-sanguine temperament, aged forty-three. Epulis, located between the right superior lateral incisor and canine, commenced its development when the patient was thirteen years of age; was excised, and in a short time had again obtained a magnitude which was not only annoying, but liable to give pain while masticating. During the past thirty years had been excised over *three hundred* times, cauterized with Ar. Nit. Fus. frequently, and the bone scraped on several occasions. This treatment was at the hands of Medical and Dental Practitioners. All thoughts of a cure had been, of course, long since abandoned.

In the mean while, the lateral incisor, having decayed extensively, broke off at its neck, and the lady applied to me for the purpose of having its loss supplied by a pivot operation. The tumour attracted my attention at once, presenting the appearance of a strangulated gum, about half the size of an ordinary grape, bluish, shiny, and bleeding freely at the slightest touch of the instrument. I informed her that, previous to pivoting, I conceived it best to cure the existing condition of things, which was, to say the least, very unsightly.

Having asked, with rather a peculiar expression, how long it would take, and having received for answer that it would probably occupy from one to three weeks, she gave me its history.

Conceiving the mode of treatment to have been entirely wrong, and much more calculated to irritate and continue than to cure a tumour of this character, my opinion was in nowise changed, but my determination was to abandon the idea of pivoting and commence by extracting the remaining fang. This was done immediately, and time was afforded for the hæmorrhage consequent upon extraction, which was very unusually profuse, to cease by the efforts of nature. Strong

Iod. Tinct. (℞.—Iod. ʒij, Spts. Rect. f℥j) was then touched upon the tumour and surrounding parts, with directions to make three applications of Acid. Tannic. daily, one after each meal, and to return the next morning. Upon the occasion of the second visit the Iod. Tinct. was again used, and the same treatment as directed before continued.

By this course the tumour was reduced to the size of a small pea in one week, when a silk ligature was tied tightly around its neck. It sloughed in twenty hours. A compress of cotton saturated with Sol. Sandarac was then adapted to the gum, held firmly in position by the cuspid and central, and hardened by water.

Some considerable pain about the face and jaw supervened, together with headache, pain in the eyes, suffusion of those organs, &c., sequences perfectly attributable to the stoppage of that habitual loss of blood which had been sustained during so long a period. To correct this, ten grains of Potas. Chlo. three times daily was ordered.

The points to which I wish especial attention directed in connection with this case are, I believe, of the utmost importance in obtaining a cure which shall be at once prompt and permanent; viz., that the slightest hæmorrhage shall be carefully guarded against during the whole treatment of such tumours, and, after their removal, the parts supported by compression until they shall have obtained a normal tonicity. It is entirely foreign to my province that I should indulge in suggestions as to the applicability of these rules outside of strictly Dental practice; but I am convinced that their adoption will enable the Dental Surgeon to afford relief in many cases which possibly may have been, for a long time, considered incurable.

[From the history of the interesting case we have just related, the patient would seem to have suffered through the ambiguous manner in which the term epulis is too often used. It is laid down in our text-books that epulis can only be permanently cured by excision and scraping of the bone; and this is perfectly correct. But then only those tumours of the gums are included under that name which are of a fibrous structure, possibly containing a number of osseous spicula, and at all times connected with the alveolar periosteum. The present growth was evidently a vascular tumour of the gum. These formations may often be cured by the application of tannic acid only: very often, however, this kind of growth is dependent either upon the presence of a diseased stump, or upon some irritation arising from the state of the neighbouring teeth: such was probably the case in the present instance. The source of irritation, the fang of the lateral incisor, was very properly first removed; and there is little doubt that this proceeding greatly facilitated the ultimate cure of the tumour. We have been induced to make these remarks because Dr Flagg himself speaks of the disease as a case of epulis. Now, if the term epulis is to be indiscriminately applied to every tumour of the gum, it will be necessary on each occasion to explain which kind of epulis is intended: otherwise it will lead to confusion, and very possibly, as it appears to have done in the present case, to erroneous practice. It would, therefore, be far better if writers would restrict the term, as is generally done in this country, to those kinds of fibrous growths to which we have already alluded.—Ed. Dental Review.]

CASE OF TIC-DOULOUREUX.

(Communicated by Mr Robert Thomson.)

The following case of tic-douloureux has been under my notice for the last three years, and believing that a short account of it might be interesting to your readers, I have forwarded you a short notice of the case.

In 1857, M. L——, of Camberwell, first applied to me to have some of his teeth extracted: he had all the appearance of a man who had undergone great suffering, so that I was induced to inquire into the history of his complaint. He described his sufferings as having commenced with a pricking, darting sensation on both sides of the lower jaw, extending to the ears and temples, but without amounting to actual pain. This sensation, however, gradually increased, and at length became very severe. He then sought medical advice, and for a time obtained great relief, although the pain never entirely left him. Some months afterwards, the disease returned with such intensity that, as the patient described it, "all the nerves of his head were in commotion, and he felt as if red-hot wires were being driven into his temples." These paroxysms would continue for twenty minutes or half an hour at a time, and would then subside; but the least wind blowing on to his face, or any sudden jar in walking, would produce a fresh attack.

He was again under medical treatment, but with only temporary benefit. He was then advised to go into the German Hospital, where he remained for some months, but came out no better. He was then a patient at Guy's Hospital, where he also remained for some months; and this time, when he left the hospital, his health was much improved, and continued so for about twelve months. At the end of this time his old complaint attacked him, and he now placed himself under homœopathic treatment. His health again improved, and remained so for about the same length of time as on the last occasion.

A fresh return of his disorder sent him a second time to a homœopathist; but he derived no benefit whatever on this occasion. It was on this occasion that he was induced to consult me (1857). I found the teeth generally defective and many of them wanting, and the gums swollen, spongy, and red. I removed two of the teeth—namely, the first and second superior molars on the left side—which were very much decayed. This appeared to give him so much relief, that he subsequently called upon me for the purpose of having others extracted; but, as the teeth to which he directed my attention were free from all external appearance of disease, I declined to operate. Since this period, half the man's time has been spent in the different hospitals, where he has remained for two or three months at a time—twice in Guy's, once in St Thomas's—sometimes better, sometimes worse, but never obtaining permanent relief for long together. It is now seven years since the commencement of his disease; and during the last four years his sufferings have been unusually severe, and he has been altogether unfit for any occupation. He called on me a few days since, with his face and mouth in a fearful state: his face was of a dark green colour, and covered with blisters; his remaining seven teeth were all loose, and as black as polished ebony; the alveolar process was gone, so that there was no chance of their ever being of further use. I therefore, at his request, extracted them. I herewith enclose three of his teeth, so that you will perceive how slight was the attachment to the gums. What medicines he has recently taken, have been supplied by a reverend gentleman, a well-known charlatan, whose name I withhold for the present. This reverend and pseudo-benvolent gentleman has pronounced the case to be one of cancer, and has promised a perfect cure. Whether he will succeed, time alone will show. I have seen the patient this morning, just two days since his teeth were removed, and he says he is much better, and can open his mouth more freely. This change I attribute to the removal of the teeth. I shall watch the future progress of the case with considerable interest, and will communicate the result, should any permanent benefit be derived.

[The teeth which Mr Thomson has obligingly forwarded to us with the above account are, as he correctly describes them, "as black as ebony," and with a polished surface. We have carefully examined the three teeth sent, two lower incisors and a canine, and find that the colour does not belong to any of the osseous structures of the teeth. The entire surface of the teeth is coated with a deposit of tartar; so much so, that even the worn and indented edge of the incisors are not free from it. At the neck of the teeth there is considerable thickness of tartar, but nothing unusual—about the same amount that is commonly found where the gums have gradually become absorbed, and the person has not benefited by the use of a tooth-brush. The black colour is entirely confined to the surface of the tartar ; but it is certainly so intense, that, at the first moment, any one would suppose the teeth had been painted with lamp-black. By chipping away a small piece, the yellowish, greyish colour, and pulverulent appearance of ordinary tartar, are readily perceived. In passing from the neck to the body and cutting edge of the tooth, the deposit rapidly diminishes in thickness, until on the upper part of the tooth it is reduced to a mere film : but this is of sufficient thickness and of such a nature as to have received the black stain, which has evidently come from without, and must have been owing to the state of the fluids of the mouth. This condition must, therefore, have resulted either from the natural state of the saliva or from medicine ; the latter being, no doubt, the real explanation of the very peculiar appearance which the teeth have assumed. As to the nature of the medicine, this can only be a matter of conjecture : but it is not likely to have been an acid, as a solution of one of the mineral acids, which could have imparted the black stain, would have so far acted on the tartar as to have loosened its adhesion to the teeth, and left them free of their present accumulation. A salt of iron or the nitrate of silver might possibly have been the cause. We should like to know how long the teeth have been of their present colour, and what has been the nature of the medicines which the patient has been using. The fangs were considerably denuded, and the extremities of them irregular from absorption ; showing that they had become a source of irritation, and that nature was endeavouring to remove them from the body.—Ed. Dental Review.]

ENORMOUS CANCROID ULCER OF THE FACE AND JAWS.

SIMULTANEOUS REMOVAL OF THE LEFT UPPER MAXILLA, OF THE GREATER PORTION OF THE LOWER MAXILLARY BONE, AND OF THE CORRESPONDING SOFT TISSUES.

(From the 'London Medical Review.')

This case, which was communicated by M. Maisonneuve to the Academy of Sciences, at a late meeting, is highly interesting both from the extent of the operation and its successful result. As nearly as is compatible with its length, we will relate it in the operator's own words.

Peter Bonnet, a shoemaker, fifty-nine years of age, deaf and dumb from birth, entered the hospital of La Pitie, on the 24th of August, 1859, to undergo treatment for a vast epithelial ulcer on the face, of fifteen months' standing.

Notwithstanding several energetic cauterisations, and the employment of iodide of potassium internally, the progress of the disease was not abated, so that in the month of February, 1860, the whole of the left side of the face was invaded by an immense ulcer, which extended in one direction from the lower eyelid to the submaxillary region, and in the other from the vicinity of the ear to ala of the nose, and even beyond the mesial line upon the upper and lower lips. The corresponding parts of the superior and inferior maxillary bones shared in this degeneration ; the gums were converted into sanious, fungating vegetations ; the few teeth which remained were uncovered and loosened, and the submaxillary glands were considerably swollen.

Despite this fearful disorder, and the incessant secretion of a sanious, fetid ichor, the general state of the patient's health did not present any grave alteration : there was no fever ; the appetite and sleep continued good ; above all, the moral condition was excellent, and the patient frequently, with great earnestness, requested an operation. Under these circumstances I thought that a final effort ought to be made, and gave the patient to understand that we should, perhaps, be able to save his life, but that it would be necessary for him, in order that such might be the case, to undergo an enormous mutilation.

This proposition having been agreed to, I performed the operation upon the 23rd of February, 1860, in the following manner :

First Step.—Carrying the point of a convex bistoury into the naso-labial fissure, I directed my incision, firstly, from above downwards, a little beyond the mid line of the upper lip ; secondly, from below upwards, along the side of the nose, as far as the inner angle of the eye ; thirdly, transversely, beneath the lower eyelid to the front part of the ear ; fourthly, down to the angle of the jaw ; fifthly, transversely, beneath the border of the inferior maxilla to a point beyond the middle line ; and, lastly, upwards, to the free border of the lower lip.

Second Step.—After some dissection, in order to expose the diseased bones, I performed, with Liston's forceps, a resection of the superior maxilla in almost its entirety, taking care to leave the arch of the palate untouched.

Third Step—Next passing to the inferior maxilla, I made a section of this bone with a chain-saw, on one side at a level with the left canine tooth, on the other side below the left coronoid process. Before finishing the removal of this bony part, and dividing the insertion of the tongue, this organ was fixed, by means of a ligature passed through its substance, to prevent its weight from drawing it backwards and producing suffocation.

After this extensive mutilation, it was neither prudent, nor even possible, to practise an autoplastic operation. I was, therefore, satisfied with applying plain dressings to the wound, and charged the house-surgeon on duty to carefully watch the tongue, which I had taken the precaution to fix to the external portions of the dressing by means of the ligature passed through its substance; and, as deglutition had become almost impossible, I directed the introduction several times daily of an œsophagus-tube, in order to give the patient nourishment and drink.

Examination of the Extirpated Diseased Tissues.—The bones were the seat of a deep destructive process, and had scarcely retained the third of their normal volume. Their surface was rugged and uneven, and their alveolar borders were completely destroyed. The soft parts, when examined by the microscope, contained a large quantity of epithelial cells.

The immediate consequences of this operation were much more simple than might have been expected; scarcely any fever was manifested, and the patient slept during a portion of the night.

On the following days the wound gradually became cleaner, a healthy suppuration was established, and the work of reparation began to evidence itself. The ligature which restrained the tongue having become unnecessary, was removed upon the fourth day, but deglutition still remained impossible. The patient, who was full of intelligence and energy, himself practised the passing of an œsophagus-tube, in order that it might be easy for him to take drink and liquid aliments at pleasure. This condition lasted until the 15th day of March. At this period the attachments of the tongue having acquired a sufficient firmness, deglutition began to be performed in a proper manner, and the patient could dispense with the tube. By degrees the contractile power of the cicatrising tissue diminished the dimensions of this enormous loss of substance; and, in addition, the rigidity of this tissue allowing the divided muscles to find a point of firm support, the tongue, the lips, and the right side of the jaw recovered their movements in such a manner as to render easy the taking of nourishment.

During some weeks I carefully watched the condition of the cicatrix, and, seeing that it remained perfectly free from any relapse, I caused an obdurator to be made in the form of a half mask, designed to restore the shape of the face; and when the patient went out of the Hospital, on the 20th of April, in order to return to the country, he was in a most satisfactory condition, the cicatrix presenting no appearance which could occasion any suspicion of a fresh attack of the disease.

MEMOIR ON TUMOURS OF THE DENTAL PERIOSTEUM.

By E. MAGITOT, M.D.

(Read before the Chirurgical Society of Paris, April 13th, 1859.*)

Translated by Robert T. Hulme, M.R.C.S., F.L.S.

(Continued from page 385.)

SECOND PART.

CASES.

GROUP II.—FIBRO-PLASTIC TUMOURS.

PLATE, Fig. 2.

Case 4.—*Fibro-plastic Tumour developed on the anterior surface of the root of the second upper bicuspid on the right side.*—(May 2, 1858.)—Fig. 2.

Madame B., aged thirty-five, of a good constitution, about three months ago experienced pains in the right upper jaw. The pains, although not acute, were constant, deep-seated, and characterised at first by a *tearing* sensation; occasionally they were shooting. There were no exacerbations or crises, but constant pain, spreading in the course of the nerves over the right side of the face, as far as the top of the head.

At the end of six weeks she consulted a Dentist, who, observing on the right side of the upper jaw several roots of molar teeth, referred the symptoms to them. These roots were neither painful nor loose; they were, however, extracted; but the pains remained the same. At this time—that is, at the end of six weeks—the patient perceived that the second upper bicuspid on the right side was loose, and extremely painful in mastication. In consequence of this, she referred her sufferings to the latter tooth, and came and consulted me.

Present State (May 2, 1858).—The right upper molars are entirely gone; the anterior teeth on the same side are sound.

The second bicuspid appears to be perfectly sound; it is, however, very loose, projects beyond the other teeth, and is painful on the slightest movement; it is particularly so when pressed into its socket, in the centre of which it moves freely, and seems to be attached to it only at its extremity. The gum is separated from the tooth; its margin is irregular, granulated, and covered with a purulent, fetid discharge. There is slight swelling of the cheek opposite the diseased tooth.

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* Baillière, Lond., 1860.

Diagnosis.—A tumour of the dental periosteum.

The extraction of the tooth was followed by a good deal of hæmorrhage. Five months afterwards the patient had remained free from any recurrence of the disease.

Examination of the Tooth.—No caries; the anterior surface of the root is the seat of a soft, whitish-coloured formation, with an irregular surface, occupying nearly the whole of the centre of this part of the tooth, and extending slightly towards its inner margin. This growth is about the size of a small bean; it is flattened on the dental surface, and is intimately attached to the periosteum at its basal surface.

Microscopic Examination.—(M. Ch. Robin, May 2, 1858.) —The tumour consists of a fibrous net-work filled with pus, and containing throughout a considerable quantity of fibro-plastic nuclei included in the fibrous tissue, which is very strong, and not easily torn beneath the microscope.

CASE 5.—*Fibro-plastic Tumour formed on the roots of the first upper molar on the right side.*—(July 30, 1858.)

Madame H., aged fifty-two years, of a good constitution, has only lost three teeth, which have been destroyed by caries. She enjoys good health, and has passed the change of life. About six months ago, when living at Nice, she felt an uneasiness during mastication on the right side of the upper jaw; some time afterwards this part became the seat of a slight but constant pain in the neighbourhood of the first molar. At various times the pain became more severe; but these attacks only lasted for a few days, and then gave way to the usual uneasiness, whose principal inconvenience was its impediment to mastication. About three months back these attacks became more severe: the local pain increased and became permanent; the slightest touch rendered the tooth extremely painful, and neuralgic pains occurred on the same side of the face; the tooth was loose, and seemed to project from its socket: there was, however, no swelling of the cheek; and these symptoms, after lasting for five or six days, almost entirely disappeared. A second attack of the same kind occurred about a month afterwards; this passed off in a similar manner to the first, and the patient remained free from them until about ten days ago, when the same thing occurred, and, this time, an abscess formed on the inner surface of the alveolus opposite the diseased tooth. The abscess, which in a few days became the size of a small nut, was opened by a dentist in the country, who did not, however, consider it necessary to extract the tooth, but attributed the accompanying symptoms to the abscess. From this time the pain became very severe, and almost unbearable.

Present State (July 30).—Madame H. has all the upper teeth on the left side. The teeth appear to be free from caries; but, by a very careful exploration by means of the sound, a slight caries, which is perfectly insensible, can be detected on the posterior surface of the first molar. The gum on this side, from the canine to the back of the mouth, is red, livid, and tumefied; the gum between the teeth is swollen, spongy, and uneven: this condition is particularly marked opposite the first molar. At this part the gum has separated from the tooth, and is absorbed to above the neck, to which it ought normally to be attached. On the inner surface of the alveolus is an opening leading to the abscess, from which there is a constant discharge of pus. The tooth projects from the alveolus, and passes some hundreds of an inch beyond the level of the other teeth; it is very loose, and is exceedingly painful when touched; the whole of its alveolar margin is bathed in a purulent fluid: the cheek is not swollen. The tooth is extracted, and when the patient was seen a year afterwards she had remained cured.

Examination of the Tooth.—At the neck of the tooth on its posterior surface is a small caries, but which does not communicate with the pulp cavity; a tumour covers the greater portion of the periosteum; it seems to have commenced in the space between the fangs, which it completely fills. From this point a portion passes forwards between the fangs, then outwards, and passing around the tooth, is prolonged on to its posterior surface above the caries. The entire tumour is about the size of a small almond; it is of a pinkish hue, and of a firm consistence.

Microscopic Examination.—(M. Ch. Robin, July 30, 1858.)—The tissue of the tumour is composed of a network of fibres, arranged in lamellæ, and accompanied with numerous capillary vessels. The fibres are distributed in layers rather than in bundles, and are accompanied with a considerable quantity of fine amorphous granular matter. In the midst of this amorphous substance are numerous oil-globules, with a diameter of from 0·001mm. to 0·015mm.; there are also embryo-plastic nuclei distributed throughout the amorphous matter, or in the intervals of the fibrous lamellæ.

CASE 6.—*Fibro-plastic Tumour developed on the roots of a right lower wisdom-tooth.*—(November 17, 1857.)

M. H., aged fifty-five years, has lost a great number of his teeth, particularly the molars. According to the patient, some of the teeth had been attacked with caries; but several had required to be removed which had no appearance of this disease. The symptoms which had accompanied the latter cases were not sufficiently clear to determine the nature of the disease; the operations had been performed two years ago. About a year ago, M. H. began to experience certain indefinite pains, not fixed to any particular spot, on the right side of the lower jaw. At this time it was a kind of dull sensation, a state of uneasiness rather than of actual pain. The corresponding upper molars having been previously removed, the patient had not eaten on this side for some time, and hence the lower teeth were relieved from the jar of the upper—a circumstance which might otherwise have indicated the actual seat of the disorder; nevertheless, M. H. believed he had noticed that the right lower wisdom had been painful during mastication.

The symptoms experienced by the patient had the character of paroxysms, occurring regularly every month, lasting for four or five days, and presenting the following phenomena:—Intermittent neuralgic pains in the neighbourhood of the diseased tooth, spreading to the ear, face, eye, and the upper part of the neck of the same side: these pains, which occasionally extended to the upper part of the head, increased during the first days of the attack, and then gradually diminishing, gave way to the usual state of uneasiness, to reappear in about a month with the same characters. It is important to observe that M. H. had never had any neuralgic pains before the commencement of the present disease, and that, although he attributed these symptoms to the lower wisdom-tooth, they had never been so severe as to determine the patient to loose the tooth, when, three days ago, the pains recurred with greater intensity than in any of the previous attacks. The patient now came and requested to have the tooth extracted.

Present State (November 17, 1857).—In the upper jaw, on the right side, all the teeth are gone behind the second bicuspid; some of the roots of the first molar remain, but they are quite insensible.

The lower teeth are well developed and sound; the wisdom, which is small, projects considerably beyond the level of the other teeth; it is loose and painful on being moved. The gum around it is spongy and absorbed; a puriform, fetid matter surrounds the base of the tooth; it presents on the external surface of its neck a caries, not very deep, and quite insensible to the probe.

I diagnosed a tumour of the periosteum, and proceeded to extract the tooth; this was easily accomplished, and gave rise to a considerable amount of hæmorrhage.

Examination of the Tooth.—The crown of the tooth is perfectly sound; at the neck of the tooth, on its outer surface, is a small soft caries, of no great depth, not communicating with the pulp cavity, and which could not, therefore, be the seat of pain, nor have caused any of the symptoms.

The roots converged so as to form a cone, of which the apex is directed backwards, and upon which a tumour is situated. This formation surrounds the apex of the roots; is prolonged on to the sides of the tooth and into narrow spaces between the conjoined roots; its volume is about equal to a small nut; it is of a soft consistence, and of a whitish colour.

Microscopic Examination.—(M. Ch. Robin, November 18, 1857.)—A network of lamellæ, with amorphous matter interposed, and filled with embryo-plastic nuclei. The tumour also contains a certain number of pus-globules, most of which are filled with coarse granules. There are also some cytoblastions and myeloplaxes. No epithelial cells either on the surface or in the substance of it.

CASE 7.—*Fibro-plastic Tumour developed on the roots of the first right upper molar.*—(June 27, 1858.)

M. J., aged fifty-six, of a good constitution, about two years ago felt the first commencement of his present disorder.

At this time there were dull pains about the situation of the first upper molar, accompanied with some elongation of the tooth, slight pain in mastication, and a very distinct swelling of the cheek. These disturbances were so mild that they attracted but little attention; they lasted for some few days, and then entirely disappeared. Afterwards, for a short time, mastication was difficult and painful, but subsequently returned to its previous state; only, towards the termination of the attack, the patient observed that when the gum opposite the outer surface of the diseased tooth was pressed with the finger, a discharge of pus took place, coming apparently from a small gum-boil.

From this time M. J. had a return of the same symptoms at intervals of about three months. Their intensity and duration were the same; they terminated in a collection of pus, which was removed by pressing the part with the finger, and the functions of the tooth, which were suspended during the attacks, became restored.

These constant discharges had, however, produced an indurated spot in the cheek, around which the elements of the subsequent discharges became deposited.

Lastly, about ten days ago a fresh attack took place. The cheek became very much swollen; but, what was remarkable, the tooth this time continued firm and quite insensible, so that the tooth could be used in mastication at the same time. M. J. stated that he could not express from the gum any purulent matter, as in the former attacks. This time, therefore, the symptoms appeared to resemble an inflammation of the cheek, which continued to spread, and was soon accompanied with constitutional disturbance. Thus, during the following days M. J. had fever, increased at night-time, headache, restlessness and want of sleep.

On the 27th of June, M. J. came to me for advice.

Present State.—The right cheek very much swollen; the centre of the tumour appears to correspond to middle of the upper jaw. There was fluctuation in the centre.

Condition of the Upper Teeth.—Right incisors perfectly sound; of the canine and first bicuspis, only the roots remaining for some years; these are not at all painful. The second bicuspis wanting; this tooth had been extracted thirty years ago, after violent inflammation. The first molar is perfectly developed, and there is no apparent disease of the crown; it is quite firm, and not at all elongated; pressure on the dental arch and direct percussion produces no pain. The second molar is the seat of a small central caries, which has never given any pain, and which was stopped three years ago. The wisdom-tooth is not through the gum: the gum which covers the internal surface of the tooth is not altered, while, from the slight extent to which the mouth could be opened, the condition of the external gum could not be seen; it is not, however, the seat of any pain.

By means of a bistoury, I made an incision into the centre of the tumour on the exterior, and let out a considerable amount of healthy pus. From the opening I examined the cavity by means of a probe, and, after some trouble, I came upon a considerable extent either of osseous or dental substance. By pressing and percussing the surface, the patient was able to refer it to the first molar. Moreover, when the finger was introduced into the mouth, it was easy to perceive through this tooth the sensation communicated by the external shock.

Some strips of lint were placed between the edges of the external wound, and poultices were applied to the cheek.

Thursday, July 1st.—The purulent discharge, although it had diminished, still continued.

A fresh examination of the mouth again showed complete insensibility of the teeth and stumps in the right upper maxillary bone. I mentioned to the patient the importance of sacrificing the first molar. M. J. would not consent to this, but requested me to extract the fang of the first bicuspis, which was close to the first molar, and to wait, hoping that its removal would produce some amendment. I consented to perform the operation; but when the root was examined, no change had taken place in it which could account for the symptoms.

July 3rd.—The same discharge of purulent matter from the opening in cheek.

July 6th.—It remained in the same state; the fistulous opening was again examined with a probe, and the same hard, exposed surface was encountered, always corresponding to the situation of the first molar, which the patient at length determined should be extracted.

The operation was easily accomplished. When the tooth was removed, the probe introduced into the fistulous opening no longer encountered the exposed surface.

July 10th.—The cure is complete; the fistulous opening has closed up, and the tumour is gradually diminishing.

The patient called upon me ten months after the operation, and the cure had been permanent.

Examination of the Tooth.—The crown of the tooth is well formed and sound: it is the same as regards the neck.

Of the three roots belonging to the tooth, the inner one terminates at its apex in a small soft body, of the size of the head of a large pin, whitish on the exterior, red in the centre. The two external roots form by their divergence a triangular space, having the apex directed downwards; this space is entirely filled by a soft, fleshy substance, which forms a kind of diaphragm between them. The surface of this tumour is irregular and uneven; it is white both on the surface and in its interior. It is soft, and closely adherent to the surface of the roots, which form its boundaries. Externally, it does not project beyond the level of the tooth; but, internally, it forms a projection between the interspace of the roots. Its entire volume may be compared to that of a small bean; it is flattened transversely.

Of the two external roots, the anterior presents a peculiar alteration; it is short, of a white-opaque colour, which extends into the normal colour of the others. Its extremity is rough, irregular, and clearly denuded of the periosteum. This root must have been what was felt by the probe at the bottom of the fistula, and the alteration which it has undergone is characterised chiefly by the absorption of its substance.

Microscopic Examination.—(M. Ch. Robin, July 6.)—Lamellar structure very distinct, tolerably loose, completely filled with embryo-plastic nuclei, remarkable for the clearness with which their characters are displayed, and for the presence of one or two very distinct nucleoli. The tissue also contains some oil-globules, and numerous leucocytes.

The small tumour which occupies the apex of the inner root has the same characters, with this peculiarity in it, that the embryo-plastic elements in it are less developed than in the large tumour; so that the mass, composed of nuclei of fusiform bodies included in an amorphous transparent substance, presents only at certain parts some lamelliform fibres in the course of formation.

CASE 8.—*Fibro-plastic Tumour developed on the roots of the first upper molar, on the left side.*—(July 27, 1858.)

Madame D., aged forty-six years, very regular during the last three years, has already suffered much with her teeth, of which she has lost three: 1. An upper central incisor fell out spontaneously, without having caused any serious symptoms. 2. A first lower molar on the left side extracted three years ago, which, according to the patient, had no trace of caries, but the roots were covered with a soft formation, and had given rise to same symptoms as those she now complained of. 3. The second lower molar on the right side removed two years ago, and which, according to the patient, presented the same changes as the former.

It is now sixteen months ago that Mme. D. began to have something like periodic attacks of pain every month; having the following characters:

Neuralgic pains without any apparent cause on the left side of the face, extending to the ear, neck, and eye. At the same time, the first upper molar on the same side became painful in closing the jaws; it appeared elongated, and was somewhat loose; the cheek was not swollen, but pressure on the corresponding parts of it was painful. These symptoms lasted for three or four days, gradually increasing, and then as gradually subsiding, or terminating in a hæmorrhage opposite the tooth, which gave immediate relief. This state of repose continued for about a month, when the same symptoms returned, either from the jarring of the tooth, or without any appreciable cause, and generally terminating in a hæmorrhage, which did not, however, correspond to the period when the cessation of the menses took place. Lastly, three days ago, there was an attack of a similar kind to the previous ones; but since this morning the pain has been unbearable, and the patient came to me for advice.

Present State.—The left cheek is slightly swollen, especially opposite the superior maxillary bone, and is somewhat painful on pressure. The upper teeth on this side seem entirely free from caries. The first molar is somewhat longer than the other teeth; it is evidently loose, and the corresponding part of the gum is very much depressed, and the neck of the tooth laid bare; the gum is red and much swollen, especially on the outside, and the slightest pressure is painful. I diagnosed a tumour of the dental periosteum, and extracted the tooth. The operation was very painful, and was accompanied with a considerable amount of hæmorrhage, which ceased spontaneously in about eight hours.

The patient has not returned.

Examination of the Tooth.—About the middle of the inner root is a small cavity, which, however, does not penetrate to the dental canal, and arises from a partial softening of the part. A second spot where softening has taken place occurs at the back of the tooth, on a level with the neck. The crown is perfectly sound. The tumour occupies a considerable space, principally at the base of the crown, between the fangs, and from thence spreads to the points of the latter. It forms a kind of ring round the inner fang, and covers a considerable portion of its outer surface and of its edges. It is distributed in much the same manner on the outer fangs, and fills up the interval between them. The tumour is, therefore, of considerable size, probably equal to that of a bean; it is of a whitish colour, tolerably firm, and is strongly adherent to the tooth; the surface is uneven, mammillated, and follows the irregularities of the surface to which it is attached.

Microscopic Examination.—(M. Ch. Robin, July 28, 1858.)—The tumour consists of interlaced fibres, loose at certain parts, and very compact in others. The intervals of the network are crowded with embryo-plastic nuclei, filled with granulations. Here and there are a few fusiform bodies, a few capillary vessels, a small number of pus-globules, and some oil-globules.

CASE 9.—*Fibro-plastic Tumour developed on the second lower molar on the right side.*—(August 16, 1858.)

Mme. B., aged fifty-two, of a good constitution, and has never suffered with her teeth. Her dentition is very regular and very perfect: two teeth, however, are each the seat of a slight caries, which has existed for a long time, and before there was any pain.

Six weeks ago, Mme. B. had regularly, at the intervals of a few days, neuralgic pains in the temple, ear, and eye of the right side, without any symptoms which were referable to the teeth. Thinking that she had simple facial neuralgia, Mme. B. consulted a physician, who prescribed the usual remedies in such cases, such as the sulphate of quinine, &c. These remedies, however, produced no improvement, when a fortnight ago Mme. B. experienced a new feature in the attack: every time that a warm or cold fluid was taken into the mouth, it excited acute pain in the second lower molar on the right side, and at the same time brought on a recurrence of the neuralgia. This convinced the patient that the tooth was the cause of sufferings, and she came to me August 16th.

Present State.—The first upper molar on the right side and the second lower bicuspis on the left side are attacked with caries: these teeth had been stopped a long time, and were not in the least painful. The first lower molar on the right side is somewhat loose: it has no caries; striking it produces slight pain; the contact of cold water gives rise to a very acute pain; the gum is depressed around this tooth, and separated from it both externally and internally. A probe passed into the alveolus comes in contact with a soft body, which bleeds when touched, and gives rise to the same pains as those to which the patient has been liable. Percussion of all the other teeth on that side elicits a clear sound, while the diseased tooth gives the dull tone of loose teeth. When moved with the fingers, the tooth is not painful.

I diagnosed a tumour of the dental periosteum, and recommended that the tooth should be extracted. After some hesitation, the patient consented to the operation. This was easily performed; there was a good deal of hæmorrhage, but it ceased of itself. The patient called on me two months afterwards, and was quite well.

Examination of the Tooth.—The tooth is quite free from caries. About the middle of its external surface, midway between the neck of the tooth and the extremities of the roots, is a soft substance, which appears to originate in the intervals of the roots, these being very close together, and extends from that part backwards and forwards. This formation seems to extend all round the tooth. It is not much developed, and its volume cannot be easily estimated. It is of a soft consistence, of a whitish colour, and its firm adherence to the tooth only allows of its being removed by tearing it away.

Microscopic Examination.—(M. Ch. Robin, Aug. 16.)—The tumour consists of a fibrous network, merely filled with fibro-plastic nuclei, fusiform bodies, and pus-globules. The network is very compact, the fibres very distinct and regular.

CASE 10.—*Fibro-plastic Tumour developed on the roots of the first lower molar, on the right side.*—(January 13, 1859.)

Madame D., aged fifty-six, of a good constitution, has lost eight of her teeth, bicuspids and molars, for the last six years. According to the patient, they were extracted for the same kind of disease as that from which she is now suffering. The teeth were, therefore, not decayed, but became loose, producing a slight discharge and attacks of pain, which lasted for five or six days, and returned at intervals of about fifteen days.

Seven months ago, Mme. D. noticed that the first lower molar on the right side had changed its position, and appeared to have an inclination outwards: it caused no pain. Subsequently the tooth became loose and troublesome, and at the end of some weeks positively painful. It was a dull, constant pain; prevented mastication on that side; and as the patient had lost the teeth on the opposite side of the mouth, she was compelled to eat with her front teeth. Matters continued in this state for some time, when an attack of pain suddenly occurred, accompanied with neuralgic pains extending to the right eye, ear, and temple, and spreading on to the upper part of the neck. The tooth became extremely painful and tender; the cheek was somewhat swollen; the lower gums, the pillars of the velum palati became inflamed, and the tonsils were enlarged. Similar attacks occurred subsequently, lasting for five or six days, and then gradually subsided, the tooth returning to its usual condition. The attacks came on at intervals of about fifteen days; during the last seven months there have been as many as twelve or fifteen of them. Only three or four of them were accompanied with swelling of the cheek, but all of them were attended with inflammation of the parts about the fauces.

Four days ago the patient experienced so violent an attack, that she came to me for advice.

Present State (January 13th, 1859).—The cheek is neither swollen nor painful to the touch. All the teeth are free from caries: the first lower molar on the right side is out of place, having an inclination outwards; it is elongated and loose. The gum on the same side is swollen as far as the back of the mouth. The anterior pillar of the velum palati and the tonsil of the same side are also swollen and red. The tooth is painful when moved or when percussed. I diagnosed a tumour of the periosteum, and extracted the tooth, which was accompanied with a considerable amount of hæmorrhage.

Examination of the Tooth.—The tooth is perfectly free from caries; on the extremity of the posterior root is a small tumour the size of a large pea, without any precise limits, and extending on to the neighbouring parts of the periosteum, and into the intervals of the roots as far as their point of junction. The formation is tolerably firm, its colour whitish, but red and injected at the apex of the posterior root.

Microscopic Examination.—(M. Ch. Robin, January 15.) The tumour consists of a fibrous network of variable density in different parts; it encloses some leucocytes, and its interspaces are completely filled with strongly characteristic embryo-plastic nuclei. Acetic acid dissolves the leucocytes, and renders more distinct the embryo-plastic nuclei contained in the tumour.

CASE 11.—*Fibro-plastic Tumour developed on the root of the second upper bicuspis, on the right side.*—(January 15, 1859.)

M. G., aged sixty, of a good constitution, has lost several of his teeth, generally after attacks similar to the present one. About a year ago M. G. observed that the second upper bicuspis on the right side was somewhat loose, but free from caries. At the same time, there was slight but deep-seated pain in the tooth, increased during mastication, the patient being obliged to use that side of the mouth in consequence of having lost all the teeth on the opposite side. The pains, although slight, remained in the same state for about two months, when they almost entirely ceased. The tooth then performed its functions as usual, and continued easy for several months, when the symptoms recurred with greater intensity than at first. Mastication again became difficult, and the pains extended to the surrounding parts, assuming a neuralgic character. This condition also lasted for about two months, and then disappeared as on the first occasion, giving way to a period of ease until the present time.

Eight days ago, under a sudden attack of cold, the local pain reappeared; but this time, instead of showing itself only during mastication, it became permanent, and was far more intense than on either of the previous occasions. The next day, the cheek was somewhat swollen; there was some fever, loss of appetite, and want of sleep. On the third day, the swelling was considerably increased, the tooth was very sensitive, and the pains extended to the cheek and temple; the symptoms then gradually diminished, and have now almost disappeared. The patient, however, fearing another attack, determined to have the tooth extracted.

Present State (January 15, 1859).—The cheek is slightly swollen; the right upper teeth are quite free from caries, and they are all perfectly firm, with the exception of the second bicuspis. The latter is very painful on the least pressure, and very loose; the gum is red, swollen, separated from the surface of the tooth, and its margin is bathed with a purulent fluid. The extraction was accompanied with considerable hæmorrhage, and was very painful.

Examination of the Tooth.—The tooth is quite free from caries; the end of the root is surrounded by a soft formation about the size of a large pea, and of a bright red colour, indicating a considerable amount of congestion; the flattened membranous state of the surface next the tooth might induce one, at first, to regard it as a thickening and hypertrophy of the periosteum confined to the extremity of the root; its outer surface is rugose and uneven; the inner surface is only slightly attached to the tooth, for in the extraction it became detached at this part.

Microscopic Examination. — (M. Robin, January 15.)—The tumour consists of a dense fibrous tissue, the interspaces of which are filled with a large number of embryo-plastic nuclei, distributed equally throughout the mass. The addition of acetic acid rendered the nuclei much more distinct, and dissolved a large number of leucocytes (pus-globules) on the surface of the tumour.

(To be continued.)

CONGENITAL FISSURE OF THE SOFT PALATE CURED BY SUCCESSIVE CAUTERISATION.—The value of conservative surgery is shown by the successful substitution of stimulant applications for the knife in the curative treatment of cleft palate, as seen by the following from the 'Lancet':—"It may be recollected that M. Jules Cloquet published in 1855 an essay on a method of applying cauterisation to the abnormal cleavage of certain organs, and that cases were therein mentioned in which union of the margins of the cleft had been obtained by repeated cauterisations. At the meeting of the Academy of Sciences of Paris of the 21st of May, M. Cloquet brought forward a case treated by Professor Benoit, of Montpelier. The child was eleven years old; the soft palate was completely cleft, and all the usual symptoms were present. The treatment lasted nineteen months, with two rather long interruptions. The whole cleft was now united, save that of the uvula, and the result was obtained by thirty-three cauterisations, fourteen with the acid nitrate of mercury, and nineteen with the solid nitrate of silver. A slight nasal pronunciation still exists, being the result of habit. M. Benoit means to apply the same treatment to the uvula."

ON THE TEETH AND MAXILLARY BONES IN THE HIGHEST FORMS OF QUADRUMANA,

CONSIDERED IN RELATION TO THE SAME STRUCTURES IN THE HUMAN SUB-CLASS.*

(Continued from page 379.)

THE investigation we have hitherto pursued, dry and unproductive as at first sight it may appear, yields on review an irrefragable basis on which an argument for the unalterable distinctive peculiarities of human structure may be founded. Although confessedly inferior in importance to the points of difference which are to be demonstrated in other parts of the organism—for instance, in the sensorium and extremities—the peculiar form and relations of the bones constituting the upper jaw in Man, supposing that it alone could be obtained for comparison, would amply suffice to proclaim the distinction of the possessor from every other known form of living being. But, as we advance to an examination of the mandible, and afterwards extend our comparison to the temporary and permanent teeth, to the order in which they are developed and come into place, and to the uses to which they are ordained, we shall find that new distinctions between human structure and that of the highest Quadrumana arrest attention at every step of the process; and moreover, that the separation of which these distinctions are indicative cannot, by any fair process of philosophic reasoning, be reduced to mere alteration ascribable to the effect of adventitious influences.

The lower jaw (mandibula) in Man and the Quadrumana consists of two lateral symmetrical parts, joined anteriorly in the mesian line. Separate at first, anchylosis takes place between the two lateral portions at an early period. In the human subject, their union is perfected during the second year after birth. Each half consists of two rami, known from their direction as "horizontal" and "vertical." By their union, the two horizontal rami form the "body" of the bone; the line of junction is termed the "symphysis." The alveoli of the lower dental series occupy the upper border of the horizontal ramus. The vertical ramus projects upwards from the hinder extremity of the horizontal; the junction of its posterior border with the inferior boundary of the horizontal constituting the angle of the jaw. The anterior border of the vertical or ascending ramus terminates above in a process, the coronoid, into which the crotaphite or temporal muscle is inserted. The upper border of the ramus is hollowed into a concavity between the coronoid and the articulating process or condyle, the latter surmounting the posterior border, and terminating the superior concave margin of the ascending portion of the bone. Such are the general features; we will now proceed to note and compare the peculiarities of the mandible in each of the subjects selected for review.

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* On the Classification and Geographical Distribution of the Mammalia. By Richard Owen, F.R.S. London, 1859.

Catalogue of the Osteological Series in the Museum of the Royal College of Surgeons. 4to, 1855.

On the Zoology of the Chimpanzee and Orang Utan. By R. Owen, F.R.S. Zool. Trans., vol. i., London, 1835.

Osteological Contributions to the Natural History of the Orang Utans. By Richard Owen, F.R.S. Zool. Trans., vol. ii.

Osteological Contributions to the Natural History of the Chimpanzees. By Professor Owen. Zool. Trans., vol. iii., 1849.

Osteological Contributions to the Natural History of the Chimpanzees and Orangs. By Professor Owen, F.R.S. Zool. Trans., vol. iv., 1858.

In Man, the lower jaw is distinguished by the shape of the body, or that portion formed by the two horizontal rami; it is convex in its general outline, which resembles that of a horse-shoe. The horizontal rami are short, and the antero-posterior measurement of the entire jaw is small when considered in relation to the space which separates the two condyles, and the corresponding proportions in the Quadrumana. The alveolar border describes a regular parabolic or elliptic curve; the dental sockets are separated by thin osseous plates, and progressively increase in size from the incisor teeth to the molars; there is no diastema or vacant space to interrupt the series. The union of the lateral halves is marked externally by a projecting ridge, which terminates below in a jutting horizontal process or promontory, the chin. This is a distinctive feature in Man: it is as unmistakeably present in the dark varieties as it is in the higher civilised races; to it the structure of no inferior animal indicates an approach. Below the second premolar tooth, about midway between the border of its alveolus and the lower border of the jaw, is situated a foramen (the mental), for the transmission of the terminal branches of the dental nerve and artery.

The external surface of the jaw, below the commencement of the anterior border of the vertical ramus, is protuberant in Man. In some human skulls, a line or ridge, the external oblique, extends obliquely upwards from near the symphysis towards the anterior border of the mounting ramus; but this is not of constant occurrence. In approaching the ascending portion of the bone, a slight and gradual diminution is observed in the vertical extent of the horizontal ramus. The anterior border of the vertical ramus is formed by the convergence of two ridges; the external commences usually below the outer surface of the second molar alveolus, the internal from behind the socket of the last molar. These ridges converge regularly and directly as they ascend; there is no angular deflection of the internal one. The terminal point of the coronoid process is in a vertical line with the lower portion of the anterior border of the ascending ramus. The concavity between the coronoid process and condyle is comparatively wide and shallow. The convex and oblong condyle is compressed from before backwards; its greatest thickness is near the middle of the joint, and its articulating surface is well defined. The angle is a well-marked feature in the human jaw; it is usually somewhat more rounded off in the Australian, but the difference is slight as compared with the posterior contour of the mandible in the Gorilla. In some human jaws, the external surface of the angle presents a protuberance and a vascular groove.

On turning to the internal surface of the bone, and commencing anteriorly, we find no projection backwards of its inferior border below the symphysis. The posterior surface of the symphysis is usually marked by two or more tubercles, which give attachment to muscles, the "spinæ mentales." A ridge, the internal oblique, extends obliquely downwards and forwards, from the posterior border of the last molar alveolus to below the socket of the first tooth of that series; the inner margin of the molar alveoli overhangs the portion of the jaw below them. The entrance of the dental canal (foramen dentale) is situated on the inner surface of the ascending ramus, about midway between the anterior and posterior border, and somewhat higher than the line of the alveoli. It is of considerable size, especially in the white races, and in many jaws its inner boundary is continued backwards in the form of a projecting process. The internal attachment of the temporal muscle on the inner side of the coronoid process (crotaphite fossa) is but slightly marked in the human jaw. One or two slight ridges, and a roughness of surface, indicate the attachment of the internal pterygoid muscle to the inner side and posterior border of the ascending ramus.

In contrasting with the human inferior maxilla the mandible in the highly-organized Apes selected for comparison, we shall commence with the genus *Troglodytes,* and would first direct the reader's attention to the lower jaw in the larger species, *Tr. Gorilla.* The first thing that demands observation is the much greater size of the bone in proportion to the size of the animal. The height of the adult Gorilla is five feet six inches; but the jaw is at least twice as massive as that of Man, and its length is considerably greater, not only absolutely, but in proportion to the space which separates the condyles. In a specimen of the adult male examined by Professor Owen, "the length of the jaw, in a straight line from the back part of the condyle to the fore part of the symphysis, was seven inches five lines; from the outer side of one condyle to that of the other, five inches five lines." In Man, the inter-condyloid measurement is quite equal to that of the same space in the Gorilla, in many skulls it is greater; but the length of the adult male human jaw, measuring in the same way from the back part of the condyle to the front of the symphysis, is only from four and a half to five inches. The next point of difference is, that in the bone under consideration there is no approach to the regularly convex horse-shoe shape which characterises the human mandible. If lines drawn on each side, from the outer side of the condyle to the outer side of the canine alveolus, be produced, it will be found that the rami diverge from each other at an angle of 35°. The alveoli, from the canine to the last molar, are almost in a straight line, with a very slight bend inwards; they are parallel on the two sides, and are joined at right angles by the line of the incisor alveoli, which unites them in front. In Man, the size of the aveolar sockets increases in regular gradation from the central incisor backwards: in the Gorilla the incisor alveoli are the smallest; next in size is the socket of the second premolar; those of the true molars and first premolar are about equal; whilst the largest and deepest depression is that for the great canine. The anterior surface of the jaw exhibits as strikingly the entire absence of chin, as does the same region in animals much lower in the scale of organization. The external surface of the symphysis, curving downwards and backwards from the alveolar border with a gentle convexity, is destitute of any median verticle ridge, and of all transverse rising or tuberosity. The mental foramen is situated below the first premolar tooth—not the second, as in Man, the Chimpanzee, and the Orangs. In one of the specimens described by Professor Owen, it was double on the right side, a smaller opening existing in front of the principal, and two or three much smaller foramina were observed behind. In Man, the "foramen mentale" is always single. In the Gorilla, the opening is placed a little nearer the lower than the upper border of the mandible. The outer walls of the incisor and canine alveoli are slightly protuberant, as is also that occupied by the anterior root of the first premolar; corresponding depressions mark the interspaces. The external surface of the horizontal ramus is flat, but becomes slightly convex near the lower border; along the outer margin of the molar sockets is a thin ridge of bone, and beneath it a shallow longitudinal depression; but the external oblique ridge is absent in the Gorilla, and although there is a slight protuberance below the outer anterior commencement of the vertical ramus, the degree of elevation is less than in the human subject. The vertical extent of the horizontal ramus, instead of diminishing as it approaches the ascending portion of the bone, increases in the Gorilla. The vertical ramus commences anteriorly, as in Man, by two ridges; the outer one forms a platform of bone, which extends outwards beyond the last molar alveolus: the strong inner ridge commences from behind that socket, but in its upward course it presents an angular deflection, which is not present in Man; this ridge joins the outer one after it has formed the anterior boundary of the well-marked crotaphite fossa. The anterior border of the ascending ramus is vertical for two-thirds of its extent; it then gently curves backwards, so that the point of the coronoid process is considerably posterior to the fore part of the base of the ramus—not on the same vertical line with it, as in Man. The concavity dividing the coracoid from the condyloid process is proportionately deeper than in Man. The inner end of the articulating condyle is the larger; it also differs from human structure in the want of definition in the posterior portion of the articulating surface, which is insensibly lost on the neck of the process. The angle of the jaw may be said to be absent in the Gorilla; for the lower border of the horizontal ramus passes, by a regular convex curve, into the posterior border of the ascending. On the inner surface of the latter are four or five tuberosities, with intermediate depressions for the attachment of the pterygoid. The internal surface of the symphysis is marked in its lower fourth by a rough, oval, shallow depression, divided by a median vertical ridge, which terminates below in a broad transverse ridge extending backwards, and limiting the extent of the bone in this direction. In one jaw of an aged Gorilla we have had an opportunity of examining, this ridge was produced backwards, in the form of a large triangular process. The spinæ mentales on the inner surface of the symphysis are absent in the Gorilla. The inner surface of the horizontal ramus is smooth; it is not abruptly overhung by the inner margin of the molar alveoli; as in Man, neither does it exhibit the internal oblique ridge which is so characteristic of human structure—a slightly roughened longitudinal tract beneath the last two molar sockets takes its place in the jaw under consideration. The inner surface of the ascending ramus commences by a sudden but slight sinking of the surface. It is divided into two portions by a ridge which leads from the anterior internal ridge before described to the condyle; the upper and smaller surface is deeply depressed for the insertion of the great crotaphite muscle (crotaphite fossa); the lower presents about the middle of the ramus the opening of the dental canal. This is smaller than in Man, and its internal margin is not produced backwards. We have already alluded to the more numerous projections for the insertion of the pterygoid muscle on the inner surface of the posterior boundary of the ascending ramus in the mandible of the Gorilla.

It will be unnecessary to enter into so detailed a description of the inferior maxilla in the smaller species of the genus, the Chimpanzee (*Tr. niger*), as in many respects its characteristic points of structure correspond with those we have described in the Gorilla. We shall content ourselves with noticing those particulars in which the jaw of the less formidable Ape departs farther from, and those in which it makes a nearer approach to, the characters which distinguish the human mandible. Some of the latter appear merely to depend on the inferior strength and muscular development of the Chimpanzee, as compared with its more redoubtable congener. We may premise, however, that in comparison with the height of the animal, and with the intercondyloid measurement, the length of the lower jaw greatly exceeds that of Man. The adult male of *Troglodytes niger* measures four feet in height; the adult female, three feet ten inches: some of the earlier accounts, representing the attainment by the Chimpanzee of a higher stature, undoubtedly had reference to the larger species. The length of the lower jaw, from the back part of the condyle to the anterior margin of the central incisor alveolus, in an adult female skull preserved in the Museum of the Great Northern Hospital, is five inches two lines; whilst the measurement from the outer extremity of one condyle to that of the other is only four inches three lines. In this respect, therefore, the jaw offers almost as great a contrast to that of Man, as does the same bone in the Gorilla. The following are the points of greater departure from human structure :—The height of the ascending ramus is less in relation to the length of the jaw. The proportion which a line drawn vertically from the top of the coronoid process bears to the horizontal extent of the alveolar border is the same in *Tr. Gorilla* as in Man. In both it is about seven-tenths, in the Chimpanzee it is six-tenths. The breadth of the anterior surface supporting the incisor alveoli is almost as great as in the Gorilla ; it is therefore much greater in proportion to the size of the animal ; and in this very important particular it presents a further deviation from human type. The mental foramen, although below the second premolar alveolus, as in Man, is situated much nearer the inferior border of the bone than in *Tr. Gorilla.* The entry of the dental canal is lower and nearer the anterior internal ridge of the ascending ramus ; it therefore departs farther from the central position of that foramen in the human jaw. The ridge which bounds inferiorly the fossa at the back of the symphysis is of crescentic form, and is relatively broader than in some specimens of the larger species.

On the other hand, the jaw of the Chimpanzee offers a nearer approach to that of Man in the smaller breadth of the ascending portion, in the better development of the angle, in the decreasing vertical measurement of the horizontal ramus as it approaches the ascending, and in the consequent greater relative depth of the symphysis. The symphysis slopes backwards, as in the Gorilla, and is equally devoid of vertical or transverse protuberance ; but it is slightly more convex in the lower part. The anterior internal ridge of the ascending ramus does not present the same amount of deflection which marks it in *Tr. Gorilla;* it is situated more behind and farther from the external ridge than in Man. The fossa for the insertion of the temporal muscle is smaller and less marked than in the more muscular Ape. Two or three projections on the inner surface of the posterior border of the ascending ramus indicate the insertion of the pterygoideus internus ; of these the upper is the largest. The hinder portion of the articulating condyloid surface is better defined in the Chimpanzee. These differences, it will be seen, are principally dependant on the minor development of bone and muscle in the smaller species, and must not be permitted to outweigh the far more important characteristics in virtue of which the Gorilla takes its place in relation to Man at the head of the order Quadrumana.

In directing attention to the lower jaw in the genus *Pithecus,* it will suffice to point out the chief differences which distinguish it from the same bone in the genus we have already had under consideration. In so doing, we shall at first confine our observations to the mandible in the large and more typical species, the Great Orang of the Indian Archipelago, *Pithecus Satyrus.* In its greater relative size, in its general configuration, in the straightness and parallelism of the line of alveoli from the canine to the last molar, in the absence of regular gradation in the increase of size of the dental sockets from before backwards, in the absence of chin, the jaw under consideration offers as great a contrast to human type as does that of the giant Troglodyte. The following are the principal points in which it differs from the mandible of the Gorilla:—The anterior surface of the symphysis is of greater breadth, and flatter; it is more vertical above, but inferiorly it slopes backwards, as in *Tr. Gorilla.* Below it is a slight prominence, from which a rough surface extends outwards on either side. The mental foramen is situated nearer the inferior border of the bone, and below the second premolar. In the skull, however, figured in the first volume of the 'Zoological Transactions,' there are three foramina present,—a large one below, a smaller above, and a still smaller one posteriorly. The two anterior foramina are placed below the first premolar alveolus. The antero-external ridge of the ascending ramus commences lower than in the Gorilla, and is of greater development; a wider channel separates it from the internal; the latter suffers no deflection in its upward course to meet the outer ridge on the fore part of the coronoid process. The coronoid process is more obtuse, and does not rise to so great a height; the crotaphite depression is narrower, but of greater depth. The condyle is of greater antero-posterior breadth, and consequently it is of a more full oval form. The angle of the bone is better developed than in *Tr. Gorilla.* A faint indication of an internal oblique ridge is found in a narrow linear ridge which extends downwards and forwards from behind the last molar alveolus on the inner surface of the horizontal ramus. The opening of the dental canal is situated higher than in *Troglodytes niger,* and therefore approximates more nearly to its position in the human subject. The antero-posterior extent of the alveolar portion of the jaw is less in comparison with the rami in *Pithecus Satyrus* than in the Gorilla.

The mandible in the dwarfed species of Orang, *Pithecus Morio,* described by Professor Owen, agrees in its general conformation with the jaw last described. It is of smaller relative size. On comparing the figures published in the 'Zoological Transactions,' it will be seen that in *Pith. Morio* the symphysis slopes more directly backwards from its upper border, and that the commencement of the antero-external ridge of the ascending ramus is higher than in *Pith. Satyrus.* The mental foramen is single, situated below the second premolar alveolus, and near the inferior border of the bone. The alveoli of the premolars and first molar are represented as more prominent in the jaw of the smaller species.

We thus terminate our review of the bones which form the maxillary apparatus in Man and the Anthropoid Apes ; and we now ask attention to the form and peculiarities of the teeth. It is almost needless to say that in the Catarhine or Old World Quadrumana the dental formulæ both of the permanent and the milk series are the same as in Man. But in the Anthropoid Apes, in common with inferior members of the group, the purposes for which the teeth are designed differ from those which they fulfil in Man. In him, their primary use is the division and mastication of his varying aliment; and, secondly, they subserve the faculty of speech. The unbroken series and equal length of the teeth, the thin crowns of the moderately-developed incisors, the smooth equality of their posterior surfaces, their vertical or nearly vertical implantation,—are all provisions in which may be recognised a design in unison with the capacious and complicate brain, the exquisitely-organized larynx, and the flexible and highly-endowed tongue. In human organization, all is rendered subservient to the expression and embodiment of thought. In the Great Ape, the dental apparatus is constituted on a different plan, and answers a widely-differing purpose. Endowed with no power to conceive or perfect instruments by which he may repel attack, or assert superiority over the denizens of his native forest, Nature has furnished his jaws with organs of other mould than those which add enchantment to human smiles, and give distinctness to the accents of human eloquence. His teeth are destined not only for the comminution of his coarse vegetable food, not only for overcoming the resistance of the tough rind or harder shell which encloses the sapid fruit, but as deadly weapons they may claim equality with the fangs of the highest Carnivores. The great cuspidate canines of the Gorilla, implanted deep in the ponderous shafts of the jaw, and worked by the enormous masses of muscle which spring from the crested cranium and huge zygomatic bars, constitute an armature corresponding with the untameable ferocity and brute courage, before which even the boldest elephant-hunter quails. Professor Owen was informed by the commander of a British trader, "that he had seen a Negro at the Gaboon frightfully mutilated by the bite of the Gorilla, from which he had recovered. Another Negro exhibited to the same voyager a gun-barrel, bent, and partly flattened, by the bite of a wounded Gorilla in its death-struggle."

Another, and, if possible, more important point of differentiation, is the sexual inequality in the development of the canines which is observed in all the Anthropoid Simiæ. The size of these teeth in the males, both of *Troglodytes* and *Pithecus*, far exceeds their dimensions in the weaker sex. The huge laniaries of the Gorilla or Orang are to be ranked as sexual developments in the same category with the antlers of the Stag and the tusks of the Boar, and, like them, they indicate a provision by which the function of continuing the species devolves on the males of greatest bodily strength and prowess. It appears to us that the absence of all sexual distinction in the teeth of Man, points as decidedly to an impassable barrier between his organization and that of the brute Ape, as does the symmetry of his limbs, his plantigrade foot, or his perfect hand. Moreover, let it be remembered (as is remarked by the great anatomist on whose researches these papers are founded), that to no external circumstance can the superiority in development of the canines in the male be ascribed. Whilst the young of the two sexes are still nourished by their mother's milk, long ere the development of the sexual system is perfected, the crown of the great male cuspidatus is being calcified and made ready to displace its small deciduous predecessor. It is, therefore, a preordained structure, a weapon forged whilst yet the forces which are to wield it are undeveloped, and long before the instincts to which it is to be subservient have asserted their sway.

The upholders of the doctrine of the distinct creation of species have been charged by some of their opponents with allowing their judgments to be shackled by the fetters of a traditionary faith ; by others, with giving an undue scope to the exercise of the imaginative faculty—with permitting it to assume an unwarrantable influence in a discussion which should be conducted in exact accordance with the laws, and be scrupulously restricted within the limits, of rigorous induction. We submit that no small demand is made both on faith and imagination, when the naturalist is required to believe that an assemblage of organs analogous to the armoury of the Gorilla, with its formidable garniture and the massive apparatus by which its weapons are wielded, has been transformed into the human mouth—has become endowed with its extraordinary adaptability to the expression of mental conditions ; insomuch, that even the configuration and mode of implantation of the teeth have been rendered subservient to the faculty of speech ; that these *acquired* peculiarities have become so established in Man, that anatomical science can trace the design long before the power of articulation has been developed in the individual : moreover, that this marvellous transmutation has taken place either under the influence of external and accidental circumstances, or from the operation of a law of natural selection of which no evidence can be obtained during the historic period, and to which the records of the rocks afford no confirmation.

We confess that, to our minds, the time-honoured belief, that each beast of the field was created *after his kind*, and that Man has a right to boast a higher and nobler descent, involves no such drafts on credulity, and demands no such flight of imagination.

The detailed comparison of the permanent and deciduous teeth, and the order of their succession, we postpone to our next number.
F. C. W.

THE anæsthetic properties of the bromide of potassium have been turned to good account by M. Guersant, surgeon to the Hôpital des Enfans Malades, in the performance of operations in the neighbourhood of the throat and pharynx, and more especially in that of staphyloraphy in the case of children. This practitioner has found that the administration of this salt in subdivided doses, to the amount of ten grains daily for a certain period, will produce a state of anæsthesia, more or less complete, in the parts concerned in the above-mentioned operation, rendering the employment of chloroform unnecessary, and still giving the surgeon the benefit of his patient's co-operation.—'Lancet.'

M. FLOURENS presented to the Academy of Sciences, June 4, 1860, an account of a case in which the bones and teeth of a fœtus became coloured by madder given to the mother with her food during the last forty-five days of gestation. Not only were the bones of the fœtus, but even the teeth were reddened ; thus showing that the blood of the mother communicates so freely with that of the fœtus, that the colouring principle of the madder is conveyed with the blood from the mother to the fœtus.

PROCEEDINGS OF DENTAL ASSOCIATIONS.

AMERICAN DENTAL ASSOCIATION AND AMERICAN DENTAL CONVENTION.

(From our American Correspondent.)

Philadelphia, Aug. 15, 1860.

I HAVE endeavoured to fulfil my promise as to a Report of the proceedings of the two Conventions; but the last Convention not getting through till the 11th, and my having a long day's ride home from the place of meeting, and a Sabbath intervening, has made considerable delay, and now we are close on to the middle of the month.

THE AMERICAN DENTAL ASSOCIATION.—A Delegated Body held their Meeting to complete the organisation, in Washington, July 31st, continuing in session some four days.

There were Delegates present from the District Columbia, the States of Georgia, Ohio, Pennsylvania, Illinois, Indiana, Missouri, Kentucky, and Michigan.

The draft of a Constitution, which was reported at the previous Meeting and recommitted, was taken up article by article, and after considerable amendment and revision was adopted, and officers for the ensuing year elected, as follows: Drs W. H. Atkinson, President; Gibbs and Clark, Vice-Presidents; Taft, Recording Secretary; Rogers, Corresponding Secretary; Dillingham, Treasurer. After which, some few Essays on various subjects were offered and read. Resolutions were offered and passed, looking to a higher standard of literary and scientific attainments—the necessity for a Collegiate Education, and the formation of Local Societies. Committees were then appointed on arrangements,—Publishing, Prize Essays, Dental Pathology and Surgery, Dental Physiology, Mechanical Dentistry, Dental Education, Dental Literature, and Dental Chemistry. There were no discussions; the adoption of a Constitution, reading of Essays, and appointment of Committee, occupying the entire Session.

The next Annual Meeting was ordered to be held in Cleveland, Ohio.

AMERICAN DENTAL CONVENTION.—The sixth Annual Meeting of this Convention was held at Saratoga Springs, commencing August 7th, and closing August 10th.

The President, on calling the Convention to order, congratulated the members upon the interest manifest in these gatherings by the goodly number in attendance. An abstract of proceedings of previous meetings was read ; reports of committees were made ; and election for officers for ensuing year was held, resulting as follows :—President, Prof. T. L. Buckingham ; Vice-President, Dr Rodrigues ; Rec. Secretary, Dr Franklin ; Cor. Secretary, Dr Wetherbee ; Treasurer, Dr Priest ; Executive Committee, Drs Clark, Whitney, Wheeler, Searle, and Pease.

On retiring from the chair, Dr Rogers made a brief address, noting the great advances made by the Profession, and the numerous able and intelligent operators among us ; but deploring the fact that there are still quite a large class of "*tooth-tinkers*" in the ranks, who affect the standing of the Profession with the public, and upon whom he was quite, and deservedly, severe. After some very good suggestions as to the remedy, he closed with the remark, "Some have been too forward in *pressing* the claims of Dentistry, rather than wait for their recognition by the community. No person or Profession ever attained a permanent standing by talking big or putting on airs. The best way to secure respect is to deserve it, and the surest way of elevating our Profession is for us individually to elevate ourselves."

The President Elect now took the chair, and returned thanks for the honour conferred by his election, and asking the support of the members in conducting the business of the Convention.

The Sessions of the Convention were now arranged as follows: Morning Session, from nine to one o'clock ; Afternoon Session, from four to seven. The Afternoon Session was opened by the reading of a lengthy paper on "Artificial Dentures"—that being the first subject for discussion—by Dr Franklin, in which he discussed the various prominent modes of supplying the loss of the natural teeth with metals, minerals, and gums, and their respective advantages, but dwelling particularly upon the hard-rubber process. This was followed by a paper on the same subject, by Dr Jno. Allen, but more especially treating the process termed continuous gum or silicious base, of which he is the inventor, and about which he is very enthusiastic.

Mr F. Y. CLARK now read an extract from a published description of his method of making dies, and then exhibited the flasks, explaining his method very fully and clearly, by which a metallic die can be taken directly from the impression ; the impression being taken in a preparation of pulverised spar and plaster of Paris, the spar being added to render the impression more resistant to the effect of heat, &c. (His method, with drawings of the flasks, has already been published in several of our journals.) I may say here, that all who alluded to the process spoke very highly of it.

Some objection was made to the use of so large a mass of the plaster and spar, on the ground of expansion, and that this tendency of plaster was not much reduced by even a large proportion of spar or sand; and the suggestion was made that the impression be reduced in bulk as much as possible, to avoid the expansion.

Dr Burras now read a short paper on a new method of obtaining a die by the deposition of copper on the face of the impression by the use of an electro-galvanic battery, forming a copper mould, which could be filled in with other and harder metal, thus giving a copper-faced and a very perfect die. All who spoke on this subject agreed as to the accurateness of the die, but objected to the length of time required in the process.

The question *how soon after extraction should artificial teeth be inserted* was now very fully discussed; some insisting upon immediate insertion, and urging that if the patient remain long without teeth, the lower jaw becomes reduced to a more limited action, and the patient finds more difficulty in accommodating himself to the substitutes than if inserted at once or on removal of the natural teeth; and again, that the natural form and expression of the mouth, the speech and proper articulation, is more certainly retained by the early insertion of teeth. The only objection urged against this method was the greater absorption of the process by pressure of the plate than when allowed to absorb without teeth. Clipping off the ragged edges of the gums, and the rough and projecting edges of the process, was suggested; but the latter was objected to. For temporary work, taking the impression before extracting the teeth, and fitting the plate with a view to their removal that the plate may cover the sockets, was alluded to by one or more gentlemen, claiming that a better impression could thus be obtained than after extraction, in consequence of the gum becoming swollen, and that a plate thus formed would control the absorption.

The Second Day's Session was opened by a further discussion of artificial dentures, during which some objection was made to "vulcanite" on the ground of unpleasant odour, owing to the presence of sulphur, and to the action of the secretion upon it, drawing a comparison between it and the silicious base in regard to cleanliness; which objection was earnestly combated by many, who claimed that they could accomplish more with this substance than with any other single material now in use, and that prejudice was the only obstacle to its general adoption.

A Member described his process in preparing the mouth for artificial teeth by removing the ragged edges of gum and process, and in forming his plate so as to anticipate and control the absorption; which anticipatory process met with no very favourable response, and yet the Member claimed that his plan had proved eminently successful.

(To Mechanical Dentistry had been given a prominent position in the proceedings of this Convention, for the reason that complaints had been made that in the previous meetings it had been kept in the background. This will explain why so much time was devoted to this one subject.)

The second subject, "Structure and Nutrition of the Teeth," was now taken up and fully discussed, but in a somewhat discursive manner, such as treating of the various substances calculated to produce tooth-bone in the fœtus—the use of phosphates, and bread from unbolted flour, &c., by the mother, and after birth by the child also. One case, among others, was cited, of two children by one mother, with miserable teeth; but during utero-gestation with a third, the mother was treated with the phosphates, and the result was a marked improvement in the character of the teeth of the child. Vital force was requisite to the appropriation of these substances; without it they were powerless for good.

"Irregularities" was the subject on the opening of the Third Day's Session. Many processes and appliances suggested here could only be made plain by drawings; therefore, but little can be reported intelligibly, and that little only suggestively:—Knowledge of physiology necessary to success in treatment—cause, tardy absorption of the deciduous, and in eruption of the permanent teeth—germs occupy an improper position, too large to find room in the circle—enlarge arch if too small, or extract second bicuspid if the teeth are too large for the arch; descriptions of various appliances for direct pressure—the use of springs and inclined plane—pressure more effectual in early morning—not to be displaced too rapidly, &c. &c.

"Diseased Dentine" was next considered. In the course of some very sensible remarks by a young Practitioner, I noted down the following:—Acidity of stomach—sympathy between the inner life, or sensibility of the teeth with the stomach—caries—discoloration of the bony structure, and death of animal portion from external agents—pregnancy conducive to disease of the teeth—not diet merely, or any one cause, but other causes and conditions, affording a large field for investigation, promising valuable results—prevention more important than repair. One gentleman had seen new dentine of a very translucent character, and very hard, formed by leaving a space between the base of cavity—nerve not exposed—and the filling by inserting a plate before plugging, attributing this result to the presence and action of the pulp. Another reported the treatment of five exposed pulps, filling over them with gutta percha, which were allowed to remain for six months; and on their removal, found three nerves dead, and two still alive, with a bony deposit: filled the two latter, and preserved both pulps and teeth. A number of cases of bony deposit were reported, and the argument advanced that it was the proper function of a healthy but exposed pulp, for its own protection.

At this point reference was made to the death of Dr Blakesley, of Utica, N.Y., and resolutions were passed expressive of his merit, and of the loss sustained by the Profession in his decease. Several Members spoke in glowing terms of the deceased.

A paper on Sensitive Dentine, written by Dr Foote, was now read, embodying some very useful suggestions on causes and treatment. In the discussion on this subject, it was remarked that sensibility is the normal condition of dentine, and that often, for want of occlusion, the teeth are tender. Causes of decay, a lack of life-force, and not the presence and action of acid or other decomposing agents—density of the tissue preventing enlarged sensibility : not money, but duty, should influence our conduct and actions to our patients.

"Exposed or Wounded Pulps" were next treated of, in which it was suggested that the vitality of dentine does not resist the advances of decay—dead teeth, or those in which the nerves are dead, decay more rapidly than when living—nerves, even when slightly exposed, may be saved by proper treatment; but if much exposed, remove the nerve and fill cavity. Others thought exposure of nerve a sufficient cause for its removal. For removal of pulp, some expressed a preference, when in single-fang teeth, to the use of a small instrument, and its immediate removal; while others would rely upon a small portion of arsenic. On the subject of filling over exposed nerves, and the mode of destroying the nerve, there was great difference of opinion, each side claiming success in their respective modes. An equally diverse opinion existed as to the formation of secondary dentine, and as to plugging a cavity in which arsenic had been allowed to remain.

This subject was continued at great length on the Fourth-day Session; after which, Dr Atkinson read a paper on "Dental Teachings," which was followed by the exhibition of models, improvements, inventions, &c.

On the arrival of the hour of final adjournment, the President made some appropriate remarks on the high character of the Convention, of the information that had been elicited, and on the flattering prospect for the continued success of these Meetings; after which the Convention adjourned to meet at New Haven, the first Tuesday in August, 1861.

There were on exhibition, various appliances for vulcanising rubber for dental purposes, greatly reduced in size and cost, and more economical in use; a display of porcelain teeth, dental chairs; various specimens of rubber plates, showing great improvements in neatness and lightness; a beautiful specimen of the crystalline structure of plaster of Paris, showing the lines of expansion of this material; a new method of attaching teeth to plate by an intervening layer of rubber between teeth and plate; a model of a remarkable case of elongation of the lower jaw, with daguerreotype pictures of the patient, showing the unnatural expression of the face; paraphine, a white substance, made from coal-oil, as applicable for taking impressions of the mouth; Clark's flasks for taking metallic dies directly from the impression; and last, though not least, a specimen copy of the 'London Dental Review.'

Apologising for the imperfectness of this Report, which is due to some extent to the haste in which it had to be written, I close this already too lengthy paper. Yours, * * *

[Through the kindness of our esteemed Correspondent, we are enabled to present entire the following Address, delivered by Dr Rogers, the retiring President, at the Meeting of the American Dental Convention.]

Gentlemen of the Convention:—The next thing in the order of business, as arranged by your Committee, is an address by the retiring President. I should have been well pleased if your Committee had also given me a subject. As it is, there is no particular question before the House, and we will, if you please, consider ourselves in "Committee of the Whole, on the State of the ——" *Profession.*

I hope gentlemen will not be alarmed at the allusion; I do not intend to make a long speech, but on the contrary a very short one: I therefore protest against your leaving the House or reclining your heads for a nap.

When we look at Dentistry as it is, and compare it with what it was a few years ago, we are astonished at the progress that has been made. There is probably no art or science in which there has been such great advancement in the same length of time. And this change is seen not only in what has been attained in the principles and practice of the Profession, but also in the character and standing of its members.

It is but a short time since all that was known of Dentistry, was thought to require no higher talent or skill than that of a village barber or blacksmith. But it has now risen to the dignity of a respectable Profession, which, to be successfully followed, demands long study and thorough training, with an amount of scientific knowledge and practical skill equal to that of any other Profession.

It must be confessed, however, that many who "profess and call themselves" Dentists are sadly deficient in the qualities and qualifications mentioned. We have able writers, learned professors, and skilful operators; with, perhaps, a fine proportion of members of respectable talents and attainments: but there is still among us a large class of mere *tooth-tinkers*, who are scarcely worthy to rank with the barbers and blacksmiths of former days.

It is true that quacks and pretenders are common to all Professions and avocations; but they are more degrading to Dentistry, because the public has no certain means of distinguishing between the worthy and the unworthy.

The swarms of charlatans that hang around other Professions, are known to be outsiders with no title to stand among *regular* Practitioners. But any man may open an office and call himself a Dentist. No diploma, licence, or certificate is necessary to make him just as regular as the best. There is among us no recognised authority to declare who are and who are not qualified to practise, nor have we any certain rule by which that qualification could be determined. If we were to require a regular course of study, it would exclude many of our best Dentists, who commenced practice when there were no adequate means of obtaining a Dental education. In thus attempting to pull up the tares, we should pull up the wheat also.

This is a state of things incidental to a new Profession. The demand for Dental service in this country opened a wide and almost unexplored field of investigation, which, with its promised emoluments, attracted great numbers into the practice. Among these, were many ingenious, inquisitive men, who, untrammeled by precedents and unawed by authority, pursued their experiments with a freedom and boldness, not always indeed to the advantage of their patients, but resulting on the whole in valuable improvements and discoveries.

These, and such as these, have contributed much to make Dentistry what it now is. But they have been succeeded by a horde of impostors who are a disgrace to the Profession.

Is there no way of cutting them off? Must we always submit to such associations? I would not be arrogant or exclusive. It may be desirable, it is certainly inevitable, that there should be a wide difference in the standing and attainments of Dentists. I would recognise the humblest degree of skill that can be honestly useful among any class of people. But to be obliged to stand among impudent knaves and charlatans, with nothing to distinguish us from them, is too humiliating to be endured.

It is a legal maxim, that where there is a wrong there is a remedy.

Perhaps, in this case, it is difficult to find the remedy, or to apply it when found. Our condition is anomalous. We are standing on the body we wish to move.

Well, gentlemen, I have nothing new to recommend. The only remedy for the evil which occurs to me has been often proposed. It was particularly insisted upon in a letter to the New York State Dental Association, written by Dr Westcott, last September. It is in substance this :

That a number of our most prominent Dentists in this State (and the same may be done in other States) should obtain a Charter from the Legislature for a Dental Institute, with power to hold property, establish a Library, provide Lectures, &c., and to grant Diplomas to such persons as, after due examination, should be found qualified to practise.

This plan may not be without objections, but it seems to be the only one that is now practicable; and I am sure it could be carried into effect if the leading members of the Profession would give in their support. But precisely here is the difficulty. Many of our most eminent Dentists persistently stand aloof from all organisations, for fear of being associated with the class of persons of whom I have spoken.

This is wrong. It is selfish. It is in their power, and it is their duty, to do something to purify and elevate the Profession to which they belong. In refusing to do this, they illustrate the virtue of those politicians who profess to be for "the greatest good for the greatest number," but with whom the greatest number is always *number one.*

Let these men step down from their lofty pedestals, and lend a helping hand to their labouring brethren, and they will soon find themselves belonging to a Profession of which they will have no cause to be ashamed.

As I promised to be short, I will not now pursue this subject farther. Much has been said of late about "the elevation of our Profession ;" and I have suggested one of the readiest means of doing something towards that end. But, after all, we must not expect too much from this or any other organised effort. I said the evils of which we complain are incidental to a new Profession. We must be patient, and wait for the operation of causes that will slowly but surely bring about a change.

Some have looked to this Convention to be the great winnowing machine that should separate the chaff from the wheat. But it never had any such purpose or design. If there was any great danger of our being overrun by unworthy persons, we could adopt some restrictions for our own protection. But we have so far had no cause to complain.

Permit me to say, in closing, that in reference to the elevation of our

Profession, there has, in my judgment, been too much of boasting and self-glorification among us. Some have been too forward in *pressing* the claims of Dentistry, rather than wait for them to be recognised by the community. No person or Profession ever attained a permanent standing by talking big or putting on airs. The best way to secure respect is to deserve it; and the surest way of elevating our Profession is for us to individually elevate ourselves.

It only remains for me to thank, you, gentlemen, for repeated expressions of your confidence and esteem, and to assure you that, after serving in office for three successive years, I now retire with unabated interest in the objects of this Convention.

SOCIETY OF GERMAN DENTISTS.

In accordance with a resolution adopted last year, the second Annual Meeting of the Society of German Dentists will be held at Berlin, on the 6th, 7th, and 8th of the present month.

The following is the order of proceedings:

1. Address of the President.
2. Report of Committee, and Financial Report.
3. Election of two new Members of Committee.
4. Resolution respecting the form of Diplomas for Ordinary, Corresponding, and Honorary Members of the Society.
5. Discussion on the Vulcanite Process.
6. Lectures on subjects connected with Dental Science.
7. Discussion on the following questions, which have been proposed for consideration:
    - (*a*) Have any advantages been obtained in Germany by the Cheoplastic Method, and what?
    - (*b*) Which is the best Cement for stopping teeth recommended during the last few years?
    - (*c*) Do we obtain as favourable results with the filling-material known under the name of Crystal Gold, as with the Leaf Gold; and what differences have been observed in the various preparations, according as they have been manufactured either in America, England, France, or Germany?
8. Debate on the best means of preventing Charlatanism, or unqualified Dentists from encroaching upon the rights of the Profession.

9. To determine the time and place of the next Meeting of the Association.

According to a resolution of the Society, new Members are received under the authority of the Committee only till the next Annual Meeting. The Committee beg, therefore, to invite their professional brethren who are willing to assist in advancing the objects of the Society, to send in their names. All German Dentists of known respectability who have passed their State examinations, or other qualified Medical Practitioners practising Dentistry, can be admitted Members of the Society.

All letters concerning the affairs of the Society to be addressed to the Secretary—Mr Schmedecke, Court-Dentist, Berlin.

By Order of the Committee,

G. H. Oenicke, Vice-President, Court-Dentist to the Duke of Anhalt-Dessau, Practising Dentist at Berlin, and Commissioner of Examination at the Medical College of the Province of Brandenburg.

College of Dentists.—The Fifth Session of the College of Dentists is announced to commence on Tuesday, October 9. The premises now occupied by the College, so excellent in respect to position, have been taken upon lease for a term of years, and have been made in every respect more commodious for the Members, Associates, and Students. There will be two Conversaziones during the Session, and occasional Scientific Meetings under the management of a Committee of the Members. The Museum is undergoing re-arrangement for purposes of practical study, and a Library of reference is being organised for the use of Members. The Reading-room, provided with the Medical, Dental, and General Scientific Periodicals, will be opened for readers four evenings in the week.

Election of Members.—At a Meeting of Council held on Tuesday, August 21, the following gentlemen were elected Members of the College:—Members—Messrs W. Comley, London; F. Durant, Dorking; and J. A. Young, Glasgow. Associate—Mr F. Zwingler, London.

Obituary.

It is with extreme regret we announce the death of one of the most esteemed members of the Profession in this kingdom—Mr James Harley, of Davies street, Berkeley square.

Mr Harley was born of Scotch parents, at Gibraltar, in the year 1797, and was apprenticed to Mr Law, Dentist, of Edinburgh, about the year

1814. After the termination of his apprenticeship, he became the assistant of Mr Thomas Hutchins, of Edinburgh, who subsequently recommended him to his brother, Mr William Hutchins, of Hanover square, London, with whom he remained in the capacity of assistant during many years, until he entered into practice for himself. The kindly feeling which had ever existed between Mr Hutchins and Mr Harley continued to the last, as was evinced by the frequent allusion made by Mr Harley in his late illness to his old friend and patron. In his political views Mr Harley was a consistent and firm supporter of the principles of independence and unity of the Dental Profession. He was one of the earliest members of the College of Dentists, was for three years a member of Council, and nearly two years a Vice-President. He was also a member of the Board of Examiners, and a large contributor of specimens, of considerable value, to the Museum. His attachment to the College was most sincere and unaffected. At the distribution of the prizes of the Metropolitan School of Dental Science, he rose from a sick-bed to be present; it was his last attendance: nevertheless, he retained his recollections of his colleagues, and one of his latest wishes was that a simple recognition of his position as an officer of the College of Dentists of England should be inscribed over his grave.

For some time previous to his death Mr Harley had returned to his residence at Finchley, where he died on the 22nd of August, at the age of sixty-three years.

In Mr Harley the Profession has lost one of those simple-minded, single-minded men, upon whom, after all, everything that is good in this world rests. Too modest to enter into political intrigue, too independent to be drawn from a principle he believed to be right, and too active to be careless in the question of Professional welfare, he presents a biographical figure which abler men may envy, and friends may remember with an affection as lasting as their own careers.

NOTICES TO CORRESPONDENTS.

We are compelled to postpone the publication of Mr Thomson's papers on "IMPROVEMENTS IN DENTAL INSTRUMENTS" until next month.

Mr Hulme's Lectures on "THE STRUCTURE AND DEVELOPMENT OF THE TEETH" will be continued in our next.

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All communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," at the Publisher's, Mr H. BAILLIERE, 219 Regent street, W., NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

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BOOKS RECEIVED.

The Dental Cosmos for August (in exchange).
The American Quarterly Journal of Dental Science for July (in exchange).
American Medical Times, Nos. 3, 4, and 6 (in exchange).

THE

DENTAL REVIEW.

OCTOBER, 1860.

THE SHADOW AND THE SUBSTANCE.

At the present time, great doubt exists in the minds of our brethren on the question of *titles*. Notwithstanding that the decision of a Court of Law has declared that the acceptance of the title of "Surgeon-Dentist" is not contrary to the statute, there is a persistent doubt expressed on all sides as to what we shall designate ourselves and others. The men who possess a Medical or Surgical qualification, though they may practise Dentistry, and the men who command a large Dental practice without any formal qualification, disclaim, as a general rule, all outward manifestation of titular appendage. They put on the door the plain Mr, and are therewith content. Thus extremes meet between two series of men, and the agitation which prevails is limited to a middle place. In this middle state none are more unfortunate in their dilemma than those who have recently taken the Certificate of the College of Surgeons. We are asked repeatedly, what title does this piece of paper give? The more earnest ask, what privileges does this piece of paper give? The answer is embodied in the words of the Act by which the College of Surgeons is absolutely governed; and these are the words:

> "It shall, notwithstanding anything herein contained, be lawful for Her Majesty, by Charter, to grant to the Royal College of Surgeons of England power to institute and hold examinations for the purpose of testing the fitness of persons to practise as Dentists *who may be desirous of so being examined*, and to grant *Certificates* of such fitness."

Whoever will study this clause with legal precision, will see at once its limitations and its negations. It gives no enforced right to the College of Surgeons; it prevents no one from the practice of the Dental Profession; above all, it confers no title nor any bond of connection between the examining College and the examined man. It has been argued, indeed, that in common law the Charter is superfluous, and that if the College of Physicians or the Pharmaceutical Society, having no restrictive clauses in their present charters, were to-morrow to set up a Board of Examiners in Dentistry, and give Certificates to all who were examined, stating, that in the opinion of the said Board the said examined were competent Dentists, there is no law to prevent such establishment and such certification. The Certificate, in a word, is the same as that which might be given by any private individual in the kingdom.

The College of Surgeons itself is evidently fully alive to its true character as a Certificating medium. All connected with its Certificate is as passive as silence, and cold as death. The Certificate is a bare scrip, divested alike of seal and privilege. To its possession no title is admissible; for it is not a licence nor a permit to practise, but a statement in the way of an opinion: in a Court of Law it has no meaning, and in society no intention. Externally nothing, internally it is worse than nothing: it has carried with it a payment, it has bought a loss. In the great house in Lincoln's-inn Fields, let an owner of the Certificate test his privileges. He will find that he has the same hold there as he might have on us, if, after he had sent us a paper for publication, and paid ten guineas for its admission, we gave him a certificate to the effect that he wrote a good hand, penned fair English, and knew his subject.

We assure our readers that in the above we are moved by no feelings of criticism nor anger. On the contrary, we are far more gratified at witnessing the working of the Certificate scheme, than are those who so determinately, so desperately, and so disinterestedly set it to work. We cannot blame the recipients of the Certificate, because the majority of these received it, and paid for it, without seeing at the time its real worth. There was a noise, and a rush, and a calm, and afterwards a discontent: how symbolical of all those affairs of life in which feeling takes the place of judgment, and expectation the position of reality! We do not blame the College either, for the College must live and flourish; and what body of mortals can live and flourish, and not be gregarious? From the royal cabinet of Vienna to the private cabinet of the redoubtable Moses, what house of business is there that could resist the appeal to barter a piece of fine paper for ten guineas in hard English cash? Answer who will. In the case of the College, moreover, there were other influences favouring the transaction. The Crown gave an assenting nod, nobody individually did the business, and the profits are there open for all the great purposes of a Collegiate establishment. There are the means for direct application; they would establish a Royal College Professorship of Dentistry, open a new Museum, or roast a buffalo on the Thames when the thermometer is low enough, and afford all the certificated with a repast at once as novel as delightful. No; the College was quite right; it saw the tide, and taking it at the flood, bounded to a limited, but by no means undesirable, fortune. But, while we thus willingly exculpate and bury the past, we urge that a lesson for the future is derivable from it. We cannot forget the observation made by Mr Brady, that if the money raised by the Profession for the coffers of the Royal College of Surgeons of England had been devoted to the establishment of an independent Dental Institution, a movement really important, really progressive, would now have been one of the most gratifying results for the political future of our Profession. It was at once a truthful and telling observation this, and one to be repeated over and over again, until it wins its way. It is steadily winning its way. We have kept firmly to our duty; we are continuing to it now, in explaining the inutility and emptiness of all schemes of reform and organisation that do not leave the power of organisation and government in our own hands. Those who have so ably supported us throughout remain to help us; and an independent Institution, bearing the brunt the while, takes permanent position. Let, then, those who have been the enemies of independence review the failure of their opposition, and at least see two sides to an open question; let those who have been neutral support the one principle of unity and self-government; and every error of days gone by forgotten, the Profession of Dentistry will yet lift up its head level with all its kindred, strong in its freedom, and experiencing every advantage that is obtainable from reciprocity of learning and brotherly communion.

Further, it is not for our own good only that we should thus strive. Who lives for himself, lives for no one. It is for the public not less than for the professional good that our exertions should be put forth. We have our specific duties to the world, as well as our duties to ourselves and compeers. To perform these wide duties well, we must perform them with some approach towards a unity of purpose and action; but the end here prescribed is impossible until we can bury our internal dissensions, and base our unity of external action on a unity of sentiment and of heart. This absent, all questions of titles and distinctions are so much sounding brass and tinkling cymbal.

DENTAL SURGERY AND MECHANICS.

IMPROVEMENTS IN DENTAL INSTRUMENTS.

BY ROBERT THOMSON, L.D.S.

HAVING for some years paid considerable attention to the mechanical appliances of the Dental Profession, I have been fortunate enough to suggest several improvements and inventions in some of the instruments now in general use. These improvements have recently been honoured by the award of the Silver Medal of the Society of Arts; but as only a partial account of them has hitherto been published, I have thought it advisable to communicate the whole consecutively, with a description of their uses and methods of application.

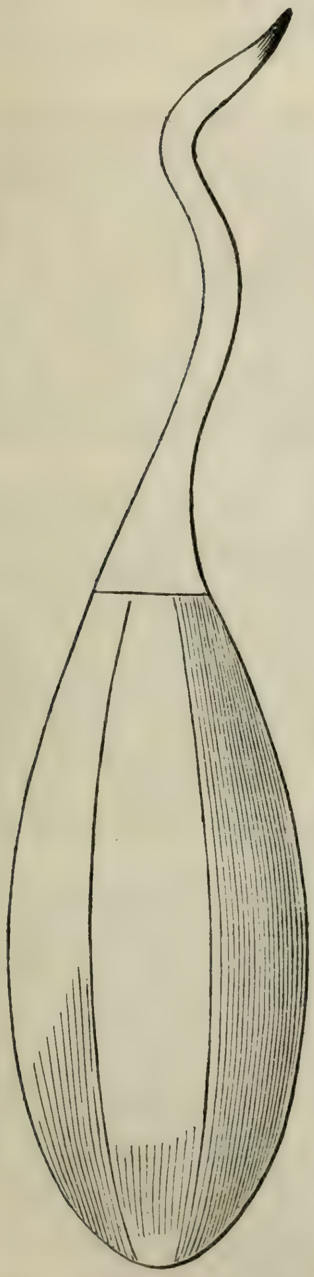
IMPROVED ELEVATORS.—The forms of the elevator hitherto generally used are so well known, that it is unnecessary to describe them. In the directions given for operating with this instrument, we are told "a fulcrum is obtained by resting the instrument on the alveolar process, or upon the side of a neighbouring tooth." This is objectionable, from the injury which may result. I have seen an adjoining tooth loosened by using an elevator in this manner, and serious injuries to the tongue and cheek, from the slipping of the instrument, have frequently followed the use of the sharp-pointed elevator. Mr Cartwright, in his 'Lectures on Dental Surgery,' delivered in King's College Hospital, in describing the application of the elevator, says truly that "steadiness of hand and care are necessary, as the gum and mouth may be much mutilated by slipping of the instrument; and, as a considerable amount of force is obliged to be exerted, it is well to surround the thumb of the left hand with a napkin, and place it so as, in case of a slip, the part shall receive the force: if the thumb be wounded, it is much better than the mouth of the patient." With the elevators which I have introduced, this precaution is unnecessary; for the handle being octagon-shaped, and the flat part of the blade roughened, the instrument is held firmly in the hand; and as there is not more than half-an-inch of the blade beyond the hand, in case of the instrument slipping no injury to the mouth need follow.

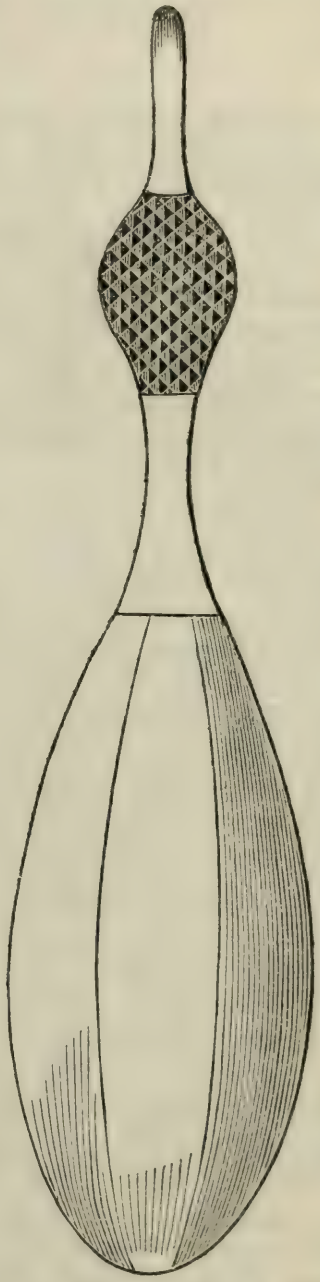
This form of elevator suggested itself to me as an expedient in the following case, which came under my notice about thirteen years since:—

A respectable young woman, of the middle class of society, had been suffering severely from local neuralgia, arising from a decayed stump, the root of the second inferior bicuspid, left side. She had applied to several parties to have it extracted, but none of them who had seen it would make the attempt. Upon examining the case, I found that the gum was very much inflamed, and there was only one thin edge of the stump above it, and the crowns of the two adjoining teeth had approximated, so that the space was too narrow for the root to come through. Therefore, there was no means of removing it with the stump-forceps, and the ordinary elevators were too broad to be available. As the patient had come a distance of twelve miles, I could not send her away without at least making an attempt. I, therefore, took an instrument that I had laid aside as useless, which I had got made some time before for another purpose, and altered it to the present form, to serve as an elevator for this case, and, without waiting to polish, used it black as it had gone through the fire; and with it I was enabled to prize up the stump, and force it through the narrow space into the mouth; so that she got rid of the exciting cause of her pain, and I produced an instrument that I have used in many hundreds of difficult cases since that time.

The drawings on the opposite page represent a front and side view of an elevator for extracting the roots of inferior incisors, cuspidati, and the first or second bicuspids on either side. The method of using the instrument is to grasp the thick part of the handle in the hollow of the hand, and placing the thumb upon the roughened part of the blade, to thrust down the point between the alveolus and the root, and by a steady, firm turn of the wrist, to prize it up, without making a fulcrum upon any of the adjoining teeth.

For the roots of the molar teeth, I have two elevators, the form of handle the same, but with the blades made longer, and curved right and left. A drawing of one of these instruments is given by Mr Tomes, in his 'Manual of Dental Surgery.' I first showed this form of elevator to Mr Thomas Bell about twelve years since, and also to Mr James Robinson. I communicated it to the Profession, through the 'British Journal of Dental Science,' in 1857; and I lent the set which were made by my own hands to the Messrs Ash, to have others copied from them. I have recently seen those they have in stock: upon the whole, they are fairly made; but one very important consideration is overlooked, namely, the thinness of the blades—they are too thick, and are scooped out so much as to represent spoons in miniature; but that defect can be easily remedied by grinding upon a corrundum wheel. They are now manufactured at Birmingham, without much, if any, knowledge of the manner in which they should be applied, and I have seen some that have been made after this fashion that were next to being useless. Hence the necessity of again publishing them in a correct form.





The sketches herewith given are the full size of the instruments. The two used for the back of the mouth are longer in the blades, and curved at the points right and left.

ON A NEW METHOD OF ATTACHING TEETH TO A PLATE BY MEANS OF RUBBER.

(Communicated by WM. HOPKINSON, M.C.D.E.)

IN making known to the Profession the following method of mounting mineral teeth on gold or other metals by means of vulcanised rubber, I do not intend to lay claim to any originality, as other practitioners may possibly have adopted the same *modus operandi.* Believing, however, that the present plan is a desideratum where it is necessary to restore the parts which have been lost by absorption, which at present can only be done by block-work, and then not with the same nicety as by the use of vulcanised rubber, I have been induced to avail myself of your valuable Journal for the purpose of making it more generally known.

A plate having been struck up, the teeth are prepared and mounted upon it with wax, and the bite properly adjusted in the usual manner when vulcanite is used. A pointed broach is to be passed between the wax and teeth at intervals, so as to mark the plate, keeping as near the teeth as possible. The teeth and wax are then to be removed, and holes are to be drilled corresponding to the marks on the plate. Into these holes, gold wire, about the size used for tube-teeth, or thinner, according to the strength required, is to be soldered, and the ends of these wires are then to be bent round in the form of a loop, so as to touch the plate.

A sufficient number of pins having been inserted into the plate, to make the case firm, the wax and teeth must be replaced as at first. The wax should be shaped on the lingual side of the teeth, taking care to cover the looped pins, so that they may remain out of sight when the case is finished. If it is necessary to build out so as to represent the gum on the labial side, keep the teeth a little apart at their necks, and build up with wax the same as you would in making a case in vulcanite, bearing in mind that the curved pins already soldered to the plate are a sufficient stay for the rubber in front. Having got the teeth in position, and the wax trimmed to represent the case when finished, place the model with the piece in the vulcanite flask, and proceed in the usual way for vulcanising.

I may observe that I invariably use steam-heat when vulcanising. When your case is sufficiently hardened, it is finished and polished in the same manner as in other cases. The above plan gives a greatly improved appearance to the case, an artificial gum being substituted for the long unsightly fangs of the mineral teeth. I have found the vulcanite, after twelve months' trial in the mouth, to be as adhesive to the teeth and plate as when first inserted.

Broughton road, Salford, September, 1860.

OBSERVATIONS UPON THE EXISTENCE OF A SALIVARY CALCULUS IN A VERY YOUNG INFANT.

THIS case occurred in the practice of Dr Burdel, and was communicated by M. Cloquet to the Academy of Sciences:—

On the 3rd of May, a poor woman brought to Dr Burdel a child, aged only three weeks, which, she said, was unable to suck, and she requested that practitioner to divide the frænum linguæ, which she looked upon as the obstacle which prevented her foster-child from taking the breast. Upon examination, Dr Burdel observed that the tongue was not held down by the frænum, but beneath this organ, which was considerably raised from the cavity in which it was lodged, the sublingual gland presenting an unusual development. At first he thought that this was only a ranula; but upon examining the tumour with his finger, he recognised the presence of a hard body. By gentle pressure he caused the point of the calculus to protrude, and succeeded in extracting it by means of a pair of fine forceps, without the necessity of making an incision. After its removal, the infant was able to take the breast with great ease.

This little calculus was elongated, larger at the middle than at the extremities, where it was terminated by very small points; its colour was yellowish, and its surface granulated, uneven, and formed of minute projections united together at their bases.

Upon analysis, it was found to consist almost exclusively of the tribasic phosphate of lime mixed with portions of an azotised organic substance, which must have been derived from the mucus of the salivary canal.

M. Cloquet, in his report, remarked that this case was of considerable interest, as the calculus could not have been developed during the three weeks which had elapsed since the birth of the child, and he was not aware of any instance of salivary calculus in new-born children, which must have been formed during intra-uterine life, a period at which the saliva contains only a small proportion of salts.—'London Medical Review.

MEMOIR ON TUMOURS OF THE DENTAL PERIOSTEUM.

By E. MAGITOT, M.D.

(Read before the Chirurgical Society of Paris, April 13th, 1859.*)

Translated by Robert T. Hulme, M.R.C.S., F.L.S.

(Continued from page 432.)

CASES.

GROUP III.—EPITHELIAL TUMOURS.

PLATE, Fig. 3.

Case 12.—*Epithelial Tumour developed on the roots of the second lower molar on the left side.*—(June 17, 1857.)

M. H., aged fifty-four, a man enjoying good health. He declares he has never had toothache, yet he has lost two teeth, the second bicuspis on the right side of the upper jaw, and the first molar on the same side in the lower jaw; they must have been removed twenty years ago, after a scorbutic affection of the gums contracted while on military service in Africa; no precise account could be obtained of the symptoms which accompanied the loss of these teeth.

The present affection commenced two years ago. At that time the patient had some pain on the left side of the lower jaw, accompanied with slight swelling of the submaxillary glands, these symptoms disappearing in the course of a few days. A month afterwards the pain recurred, and became fixed in the neighbourhood of the second lower molar on the left side. The tooth became very sensitive in mastication, compelling the patient to make use of the opposite side. The pains spread to the temple and to the ear; they assumed a neuralgic character, but the symptoms again subsided. From that time, however, there was always a dull but constant sensation of pain, sometimes very slight, in the diseased tooth, and crises resembling the preceding occurred at intervals of from one to three months. Since the commencement the patient has had from six to seven of these attacks. Three days ago the symptoms became more severe. The cheek swelled as it had done in most of the previous attacks; the submaxillary glands were very sensitive on pressure, and the tooth was the seat of an acute, lancinating pain, spreading to the head and ear, increased by the slightest touch, and even by the movements of the tongue.

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* Baillière, Lond., 1860.

Present State (June 17, 1857).—The left cheek somewhat swollen, especially opposite the lower jaw; the submaxillary glands are also swollen and painful. On examining the mouth, the gum opposite the first lower molar on the left side is seen to be livid and swollen; it is painful on pressure, and is separated from the neck of the teeth. The second molar is out of place, projecting somewhat outwards; it is painful on being touched, and projects beyond the other teeth; the latter are somewhat loose and painful when struck. Neither the affected tooth nor any of the others are decayed. All the teeth on this side, both in the upper and lower jaws, have a large accumulation of tartar, in consequence of not having been used.

The tooth was easily extracted; but the operation was very painful, and was followed by a considerable amount of hæmorrhage, which, however, ceased spontaneously in about half-an-hour.

Examination of the Tooth.—(Fig. 3 a.)—The crown of the tooth is sound, but covered with a thick layer of tartar. The roots are entirely surrounded by a soft formation, developed more especially on the posterior part, where it forms a considerable projection. On the external and internal surfaces it is of a tolerable size; but on the anterior surface it is only slightly developed, and presents a flat surface. The entire size of the tumour was equal to that of a nut. Its tissue is red, soft, and resembles that of polyps developed on mucous membranes. Its surface is free, shining, and mammillated; the adherent surface next to the cement did not appear to have undergone any change; the interval of the roots was filled up by a continuation of the tumour.

Microscopic Examination.—(M. Ch. Robin, June 18.)—The entire mass of the tumour consists of a vascular fibrous network, enclosing a small quantity of amorphous matter. The whole of the network is filled with spherical epithelial cells, very distinct, and containing one or two nuclei (fig. 3 b).

CASE 13.—*Papiliform Epithelial Tumour developed on the roots of the first upper molar on the left side.*—(June 17, 1858.)

Madame A., aged thirty, of a good constitution, has never had any disease of the teeth. About a year ago she began to have a dull general pain along the whole of the left side of the upper jaw. These pains were characterised by slight but constant shootings, which were aggravated during mastication. They were not situated in any particular tooth, and all the teeth on that side were evidently loose, and sensible to any shock; the symptoms could not be referred to any particular tooth. This state of things continued for about three months, with alternate exacerbations and diminutions of the symptoms: at the end of that time they subsided, so much so that the patient paid but little attention to them until about twelve days ago, when the pains returned. This time they were constant, acute, accompanied with shooting pains, slight swelling of the cheek, neuralgic pains in the temple and eye of the same side, loosening of the tooth, and pain on the slightest touch. These symptoms became so acute during the last few days, that in the middle of the night of the 17th and 18th of June she came to me begging me to extract the tooth which was the cause of her sufferings.

Present State (June 18).—The left cheek is a good deal swollen, the inflammation extending to the eyelids, which since yesterday have been swollen, and painful to the touch. The conjunctiva is beginning to be injected, the submaxillary glands are engorged and painful. All the teeth on the left side of the upper jaw are free from caries: the first molar is somewhat misplaced, having an inclination outwards; at the same time it projects from the alveolus, and is very loose; the slightest touch, even of the tongue, causes acute pain, which spreads towards the face. The gums on the same side are swollen and spongy, especially around the diseased tooth, where there is an accumulation of pus at their free edge. I diagnosed a tumour of the periosteum, and extracted the tooth: the operation was easily performed; but it was very painful, and accompanied with a considerable amount of hæmorrhage.

The patient visited me in the June following, and the cure had been complete.

Examination of the Tooth.—On the posterior surface of the tooth, a little below the neck, is a small tumour. Its size is that of a large pea, and is by no means proportioned to the severity of the symptoms; it is of a whitish colour and soft consistence. Limited in its dimensions, and nearly spherical, it is, however, prolonged into the interval of the roots, as far as the anterior surface of the tooth. The remainder of the periosteum appears to be healthy.

The tooth presents no appearance of caries; but the posterior external root, being very much curved, was broken off in the operation.

Microscopic Examination.—(M. Robin, June 18.)—The tumour consists of a simple lamelliform network, traversed by numerous capillaries, and filled with epithelial cells, with a distinct pavement-like form. In the tumour were some very distinct papillæ, formed by bundles of fibres and vessels, around which were arranged the pavement-like epithelial elements.

CASE 14.—*Epithelial Tumour developed on the second upper molar on the right side.*—(November 13, 1858.)

Madame A., aged fifty-one, very regular, has already lost eleven teeth, most of which have been removed in consequence of caries. One of them, however, (the first lower molar on the left side,) was lost in consequence of disease, which, from the description of the patient, appeared to resemble the present affection.

A month ago, Madame A., while eating, suddenly jarred the second molar on the right side of the upper jaw by biting against a piece of bone: up to that time the tooth had never troubled her. This produced an acute pain, which gradually subsided, and ultimately disappeared. The tooth, however, from this time became somewhat loose and painful in mastication. No serious symptoms supervened until three days ago, when acute pain came on spontaneously in the diseased tooth: this pain was constant, shooting, and was increased by the slightest movement of the tooth; at night-time it was greatly increased by the heat of the bed. The pain spread to the temple, ear, and neck of the same side. There did not appear to be any formation of matter; but her sufferings gradually became so acute, that Madame A. lost all appetite, and could obtain no sleep.

Present State.—The second upper molar on the right side, which stands apart from the neighbouring teeth, presents no traces of caries; it is somewhat loose, and, in consequence of its being elongated, projects partly from its socket. The gum is depressed, red, and swollen; the slightest motion of the tooth causes pain; the contact of hot fluids is intolerable, while that of cold liquids has a soothing effect. I diagnosed a tumour of the periosteum, and extracted the tooth, which was easily accomplished, and followed by a profuse hæmorrhage.

Examination of the Tooth.—The tooth, which is quite free from caries, has at the summit of the roots, which are convergent, a soft formation about the size of a large pea, of a reddish colour; it was partially separated from the surface of the tooth during the operation. Entirely limited to the apex of the roots, the tumour surrounds the vessels and nerves of the pulp; a circumstance which serves to explain the violence of the attack. The rest of the periosteal surface is perfectly healthy.

Microscopic Examination.—(M. Robin, Nov. 24.)—The tumour is composed of a loose fibrous network, traversed by a large number of capillary vessels, and filled with spherical epithelial nuclei, containing two, three, or four distinct nucleoli: the contour of the nucleus is very faint. Besides these elements, the tumour contained a certain number of leucocytes, or pus-globules. Acetic acid dissolved them and isolated their nuclei, and at the same revealed the presence of some fibro-plastic nuclei in the fibrous network.

CASE 15.—*Epithelial Tumour developed on the roots of a lower temporary molar on the right side, in a child three and a half years old.*—(August 2, 1858).

A young girl, three years and a half old, having all her temporary teeth, and in perfect health, began to complain five months ago of pain in the right side of the lower jaw. It was noticed, at the same time, that the temporary molar was decayed. The pains, if we may judge by the statements of the mother, were not constant; they lasted for some days, with frequent intermissions, and then disappeared. During the crisis, the child lost its appetite and sleep, and was frequently crying. This state lasted two or three days, and then ceased, but returned afterwards with the same symptoms. For the last five months the child has had these attacks every fifteen days; at those times mastication was impossible, and the child refused to eat. General symptoms accompanied the local disorder: thus, during an attack the face became red and congested, and the skin was hot; the child lost her appetite, and could get no sleep. At the present time she is much emaciated; and the mother, wishing to obtain relief for her, came and consulted me.

Present State.—The teeth are perfectly sound, with the exception of the second right lower molar, which is much decayed. An examination of the cavity shows that the pulp is entirely gone; the cheek is not swollen, but the gum opposite the diseased tooth is red and swollen. It is also lower than the gum around the neighbouring sound teeth. The tooth is loose, and projects beyond the level of the other teeth. The commencement of another attack began yesterday, and appeared to be characterised by the same symptoms as the previous ones, but the age of the child did not allow me to determine the symptoms very accurately. The diseased tooth is very painful when sounded, while the neighbouring teeth are insensible to the same test: moving the tooth laterally also caused pain.

I proposed to extract the tooth, which was easily accomplished. The child was seen six months afterwards, and was quite cured.

Examination of the Tooth.—The tooth presents a deep cavity, with complete destruction of the pulp and vessels, and nerves of the roots. The space between the two roots is entirely filled with a soft formation, which occupies the angle beneath the crown: the tumour is of the size of a small nut; its form corresponds to that of the part which it fills; it is of a red colour, very soft, and has been lacerated in some places by the operation.

Microscopic Examination.—(M. Robin, Aug. 22, 1858.)—The tumour is composed of a fibrous network, filled with epithelial elements, consisting of—1. Numerous simple nuclei; 2. Of a smaller number of spherical cells. These elements are mixed with some pus-globules, and with blood-globules, arising from the ruptured capillaries of the tumour. There are also a certain number of myeloplaxes.

CASE 16.—*Epithelial Tumour developed on the roots of the first lower molar on the left side.*—(October 15, 1857.)

This case occurred in a boy, twelve years and a half old, second dentition complete, of an excellent constitution, and who had always enjoyed good health. The first lower molar on the left side had been decayed for some years; two years ago there had been pain, apparently such as results from caries. The present disorder seems to have commenced a year back, when the tooth became painful in mastication. During the two or three months which immediately followed the appearance of this symptom, the child experienced simple uneasiness rather than actual pain; but in the month of February last a new phenomenon occurred. On the external surface of the lower jaw, opposite the diseased tooth, some small circumscribed abscesses made their appearance; these caused acute pain, accompanied with swelling of the cheek; they opened spontaneously in the course of four or five days, and thus gave relief. At the same time, the local symptoms became aggravated: the tooth was very painful when touched; it was considerably larger than the others, and projected from its socket; acute pains intervened, confined to the seat of the disease, not spreading to the neighbouring parts; and the looseness which had existed for some time was much increased. After this there was a period of quiet, which lasted for a month or six weeks, when the old symptoms returned, and numerous abscesses formed opposite the diseased tooth. In the month of September another attack came on; and the abscesses were even more numerous, lasting for fifteen days, and then terminating by resolution. The symptoms again disappeared.

Two days ago there was a fresh attack, and the mother of the child brought him to have the tooth extracted.

Present State.—The cheek is not swollen, but pressure with the finger opposite the diseased tooth is painful, in consequence of the inflamed state of the gum at this part. The external surface of the gum is the seat of an acute inflammation ; there are four or five small abscesses. The tooth is much decayed on the inner part of the crown, the caries is far advanced, and the pulp is destroyed. There is no pain on examining the cavity with the probe. The tooth is very loose, projects from its alveolus, and inclines towards the inner part of the mouth ; the gum opposite the tooth is depressed and bathed with pus ; the least movement of the tooth produces acute pain ; percussion is also painful, and produces a dull sound. The extraction was easily accomplished.

The patient was seen a year after the operation, and felt nothing of his former complaint.

Anatomical Examination.—The crown of the tooth is deeply decayed at its inner part, and contains no remains of the pulp. A tumour occupies the interval between the roots, and projects somewhat beyond it at the sides, and is also prolonged towards the points of the roots, particularly that of the posterior root, which it entirely surrounds. The whole tumour is the size of a nut. The colour varies at different parts : on the lateral surfaces of the tooth, especially the external, the tumour has a yellow tint, like that of fatty tissue ; at other parts it is of a whitish colour. At the points of the roots the tumour is much injected, and is of a deep red. Lastly, at other parts, also near to the point, the tissue is softened, and infiltrated with pus.

Microscopic Examination.—(July 30, M. Ch. Robin.)—At the yellow part of the tumour, the tissue consists of a compact, simple, fibrous network, filled with numerous fat granules having an average diameter of 0mm.001, and possessing the Brownian movement. These granulations are accompanied by a considerable number of spherical epethelial cells, filled with fat-granules and granulated pus-globules, mixed with the previous elements. The loose portion at the apex of the posterior root is composed of a fibrous network, filled at certain parts with nucleated epithelial elements, spherical or pavement-like in other parts : the ephithelial cells are very different from those of the gums ; they are smaller, their angles more rounded, they are more granular, and the granulations are finer and more uniformly distributed ; at the same time the nuclei are larger, very distinct, and often nucleated, and in several places the cells contain fat-granules.

In certain parts of the tumour which are denser than others, there is only a simple fibrous network, containing here and there some fat-granules, and a very few epithelial elements. The posterior and anterior surfaces of the periosteum are sound.

Reflections.—The differences in the anatomical characters of the tumour, according to the part examined, allow of its formation being regarded in the following manner:—The fibrous network—constituting the normal periosteum—has first undergone a simple hypertrophy, and this first phase of its development is met with in certain parts of the tumour; later the epithelial nuclei have become developed in the meshes of the primary tissue. These elements, which in the first instance were nuclear, became transformed into cells by segmentation of the surrounding amorphous matter. Lastly, the different elements mingled together—fibrous network, epithelial cells—have undergone that kind of progressive fatty degeneration which is often met with in the substance of epithelial tumours. This formation of fatty granulations has gradually extended itself more and more into the substance of the tumour, so that certain parts are almost entirely made up of it, and have assumed the yellow colour which has been mentioned. Lastly, in some parts the tissue has undergone a slight inflammation, which has given rise to the formation of pus and softening of the tissue.

GROUP IV.—MYELOPLASTIC TUMOURS.

PLATE, FIG. 4.

CASE 17.—*Myeloplastic Tumour situated on the second upper molar on the right side.*—(July 10, 1858.)

Mademoiselle E., aged twenty-two years, has already suffered much with her teeth. The first lower molar on the left side was extracted six months back, after violent attacks of pain, which appeared, according to the statement of the patient, to have arisen from caries. All the remaining molars, including the wisdom-teeth, are almost entirely destroyed by the same disease, but without having given rise to pain.

Two months ago, deep-seated pain gradually came on, opposite the first molar on the right side of the upper jaw, which had long been decayed: the pain was almost constant; was increased at night, with occasional intermissions, and extended to the whole of that side of the face, especially about the temple, usually ceasing during the night, and reappearing in the morning. At the same time, there were shooting sensations in the tooth, and pain in mastication. From time to time there was hæmorrhage from the interior of the alveolus of the diseased tooth. These bleedings were sometimes spontaneous, and at other times they arose from some shock to the tooth; they always produced a temporary relief.

The first attack occurred two months ago, lasted fifteen days, and then ceased; but the tooth could not be used in mastication. Four days ago the original symptoms returned, and the patient came and consulted me.

Present State.—The cheek is not swollen, nor is the surface of the right upper alveolus. The right upper bicuspides are entirely destroyed by caries, as well as the second molar and the wisdom-tooth of the same side. Opposite the first molar, which is greatly decayed, the gum is depressed, separated from the surface of the tooth, and bathed by a white purulent liquid, which surrounds the tooth. A probe introduced into the carious part causes no pain, and enters readily into the pulp cavity, this organ having entirely disappeared. The tooth is very loose and painful when percussed, or when the crown is pressed or moved laterally by the fingers.

I diagnosed a tumour of the periosteum, and extracted the tooth. The operation was easily performed, and was followed by a considerable amount of hæmorrhage.

The patient was seen six months after the operation, and was perfectly cured.

Examination of the Tooth.—The tooth was decayed, and the pulp cavity completely destroyed. The tumour occupied the interval of the roots of the tooth, and particularly the inner root; its boundaries are not very distinct, and it occupies a considerable portion of the periosteal surface. Its volume is not easily estimated, but it is probably about the size of a bean. It is of a soft consistence, whitish on the surface, and of a reddish tint in the deeper parts. In various places, and especially on the points of the roots, there are several vascular spots, indicating traces of partial congestion.

Microscopic Examination.—(M. Ch. Robin, July 10, 1858.) —The tumour consists of a fibrous net-work, enclosing a certain number of pus-globules or leucocytes, which are very granular. The entire mass of the tumour consists of a very large number of myeloplaxes, some with a single nucleus, granular, and opaque; others with several nuclei, transparent, large, and only slightly granular.

GROUP V.—TUMOUR WITH CYTOBLASTIONS.

PLATE, Fig. 5.

Case 18.—*Tumour with Cytoblastions developed on the inner root of the first upper molar of the right side.*—(Aug. 2, 1859.)

L., aged fourteen years, of a good constitution, having apparently no hereditary syphilitic taint, has already suffered somewhat from his teeth; the four first molars were stopped about eighteen months ago, and since that time he has had no pain.

A month ago, the right cheek became swollen, preceded and accompanied by some dull, continued pain, characterised by slight shootings. The swelling came on suddenly, and for some hours corresponded exactly to the roots of the tooth in question, which at the same time became somewhat loose and painful when the teeth were pressed together, so that the patient was compelled to eat on the opposite side. The swelling, however, was indolent; it lasted for fifteen days without increasing in size, and thus disappeared, leaving the patient in a state of ease.

Four days ago, a second swelling made its appearance, preceded by the same dull pain in the substance of the jaw: the swelling is small, soft, and indolent.

Present State.—The cheek is slightly swollen, but without any hardness or stiffness of the skin. The first upper molar on the right side, which stands alone in consequence of the loss of the temporary teeth, is the seat of a caries which was stopped about a year ago: moving or percussing the tooth produces but very slight pain. Nevertheless, the pressure and position of the swelling evidently shows that it belongs to this tooth; and the previous symptoms indicating some affection of the roots, it was determined to extract the tooth. The diagnosis was nevertheless uncertain as to whether it was a periostitis or a tumour of the periosteum.

Anatomical Examination.—The inner root presents at its apex a formation the size of a small bean; it is white, soft, covers the whole of the curved point of the root, and is somewhat prolonged on to its external surface into the interval which separates the two roots. In the operation one portion had become detached. The two outer fangs are perfectly healthy.

Microscopic Examination.—(M. Ch. Robin, Aug. 2, 1859.) —The tumour is composed of a net-work of fibrous lamellæ, widely separated from each other, accompanied with a certain amount of amorphous matter, traversed by capillary vessels, which are easily isolated; throughout the whole there is a certain number of embryoplastic nuclei, and a very large number of cytoblastions, with very distinct outlines, finely granulated, and, as usual, without nucleoli (fig. 5 b). These elements form at least two-thirds of the entire mass. This uniform distribution, and the number of these elements, give a very remarkable appearance to the preparation, especially after being acted on by acetic acid.

This tumour, notwithstanding its size, must have grown very rapidly, since its first appearance certainly does not date further back than six weeks ago. The essential constitution of the tumour (cytoblastions) accounts for this peculiarity: tumours of this nature possess a very rapid development.

(To be continued.)

ON THE TEETH IN MAN AND THE ANTHROPOID APES.*

In the present paper, we propose to institute that detailed comparison between the teeth of Man and the Anthropoid Apes, for which we have been prepared by an examination of the bones which constitute the upper and lower jaws. We would preface our review with a few remarks on the value in systematic zoology which attaches to indications based on the form and structure of the teeth. In the first place, we would observe that no organs are more indicative of the pre-ordained habits and food of the possessor. The complex ridged or tuberculate grinder of the vegetable feeder—the trenchant

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* Odontography; or, A Treatise on the Comparative Anatomy of the Teeth. By R. Owen, F.R.S. 2 vols. London, 1840-45.

The Cyclopædia of Anatomy and Physiology. Vol. iv. Edited by Robert B. Todd, M.D., F.R.S. Article "Teeth," by Professor Owen. London, 1849-52.

On the Classification and Geographical Distribution of the Mammalia. By Richard Owen, F.R.S. London, 1859.

Osteological Contributions to the Natural History of the Chimpanzees and Orangs. By Professor Owen, F.R.S. Zool. Trans., vol. i.—iv. London, 1835-58.

carnassières, and the tearing, holding laniaries of the beast of prey, are indissolubly connected with their aliment and propensities. The strong conical premolar of the Hyæna, belted by a basal ridge for the protection of the gum, constitutes a perfect instrument for breaking and crushing the bones of the forsaken carcase which forms his moonlit banquet. Dr Livingstone, in describing the habits of the Spotted Hyæna, asserts that "leg-bones of Oxen, from which the natives have extracted the marrow and everything eatable, are by this animal crunched up with the greatest ease, which he apparently effects by turning them round in his teeth till they are in a suitable position for being split;" and it was remarked to Professor Owen by an eminent engineer, to whom he showed the jaw of an Hyæna, that the tooth in question was a perfect model of a hammer for breaking stones for roads. In like manner, the thick incisors of the Orang are means expressly designed to overcome the fibrous shells and hard capsules of the fruits on which he subsists; and whilst his formidable canines might at first sight inspire the idea of a living prey, his broad and slightly tuberculate molars correct the misapprehension, and indicate another purpose to be fulfilled by the cuspidati than that of alimentation.

Again, the teeth are fixed organs. They form no part of the mechanism of motion, and for this reason they are not subject to that variety of configuration which we see constantly arising in true bones, from the less or greater development of the muscles to which osseous surfaces give attachment. Neither is their conformation modified by any other extraneous influence. Modelled in the dark alveolar recesses of the jaw at a period when the permanent mode and conditions of the animal's existence have neither been developed nor brought into play, their peculiar shape and structure must be admitted amongst those ultimate facts in science of which we can trace the purpose and design, but of the causalities of which we are absolutely ignorant. Hence it is that those species which have shown the greatest amount of adaptiveness to new conditions, which have been in the highest degree altered by domestication, or changed by the influence of climate, aliment, or other accident—under every mask of external modification—exhibit the peculiar and specific dentition of the parent stock. Of this, the Dog, the Swine, and, in fact, all those animals which under human intervention have displayed the widest divergence in form, size, covering, and even instinct, afford undeniable evidence. Man himself, than whom no creature exists under greater dissimilitude of external circumstance, wherever and however he be found—whether it be as the graminivorous Hindoo or the seal-fed Esquimo, the fur-clad Russian or the naked Bechuana, the refined Parisian or the debased Alfourou—whatever the colour of his skin, the capacity of his cranium, the loftiness of his elevation, or the depth of his degradation, still exhibits, constant and unchanged, the specific, the unmistakeable characteristics of human dentition.

The permanent and enduring quality of the tissues which compose the teeth is another circumstance which enhances their value, especially to the palæontologist. Such is the durability characterizing the dental structure, that it is not unfrequently found that the teeth alone have resisted the action of those chemical and physical forces which reduce organized to inorganic matter. Imbedded in ancient deposits on the earth's surface, they remain the solitary memorials of the being of which they once formed part—the sole indicators of its position in an extinct, and its relations to a living, fauna. On the other hand, their anatomical position renders them of easy examination in living and recent specimens.

Having premised thus much as to the general value of the information which an examination of the dental organs is capable of yielding, we turn to the special object of this paper, and, again availing ourselves of the rich fund of information for which science is indebted to Professor Owen, shall pursue the same plan we followed in our former review, first noticing the peculiarities of human structure, and then comparing it with the dentition of the Gorilla, the Chimpanzee, and the Orang. The permanent teeth will first claim attention.

It was at one time believed that the continuous series of the human teeth, the absence of all break in their implantation, was a character peculiar to Man. But the researches of palæontologists have somewhat detracted from its value as a human characteristic, by demonstrating a like contiguous setting of the teeth in the jaws of a few extinct quadrupeds; *e. g.*, *Anoplotherium*, *Nesodon*, and *Dichodon*. Still, amongst existing Mammals, Man alone uniformly presents an uninterrupted dental series. In *Troglodytes Gorilla* and *Troglodytes niger*, concomitant with the large development of the laniary, an interspace separates that tooth in the upper jaw from the lateral incisor, in the lower jaw from the first premolar. In the male Gorilla, the diastema in the upper jaw measures two lines in breadth; in the female, one line and a half. In the lower jaw, the canine is separated from the first premolar by an interval measuring one line and a half. In *Troglodytes niger*, the diastema in the upper jaw is greater, both in the male and female, than in the Gorilla; in the male skull it measures three lines, in the female two. In the lower jaw, the unoccupied space between the laniary and the premolar does not exceed a line in breadth: in one female skull we have examined, it is absent on the left side; but a small interval separates the canine alveolus from that of the lateral incisor.

In the Great Orang, *Pithecus Satyrus*, the diastema is well marked in the upper jaw; it sometimes measures four lines in breadth, and is rarely less than three. In the lower jaw, in many instances, the teeth present a continuous series; but occasionally an interval exists between the canine and premolar, and sometimes between the former tooth and the lateral incisor. In one male skull of the smaller species of Orang, *Pithecus Morio*, the interspace in the upper jaw between the canine and outer incisor exceeded two lines in breadth; in the lower jaw the teeth presented no break in their implantation. In another specimen, in both jaws the dental series was as continuous as in the human subject. The absence or minor development of interspaces between the teeth in *Pith. Morio* is dependent on the large size of the canines and incisors, which equal the same teeth in *Pith. Satyrus*, and on the smaller relative size of the jaws. It is this equality in the size of the teeth in the two species which induces Professor Owen to suspect that *Pith. Morio* may have originated in a dwarfed variety of the larger Orang. The specific differentiation between the Chimpanzee and Gorilla is sustained by the smaller size of the dental organs in the former. On the contrary, there is no diminution in the dimensions of the teeth concurrent with inferiority of stature in the dwarfed varieties of the human race.

Incisores.—The characteristics of the human incisors are, their smallness of size in proportion to the other teeth and to the entire skull; their near equality of size with each other; their thin wedge-like form; and their vertical or nearly vertical implantation. In the upper jaw, the two middle incisors slightly exceed the lateral in breadth; the posterior surfaces of both are smooth and slightly concave. The middle incisor presents a slightly-developed basal ridge on its posterior surface; but such elevation is entirely absent on the posterior surface of the lateral one. The external angle of the crown of the lateral incisor is not rounded off, and is in contact with the canine. In the lower jaw, the incisors are somewhat smaller than in the upper, and the breadth of the central is slightly inferior to that of the lateral; the outer angle of the crown of the latter is entire.

Genus *Troglodytes.*—In *Tr. Gorilla* and *Tr. niger* the incisor teeth are not only absolutely much larger (thicker and broader) than in Man, but they are of far greater size in proportion to the molar series and to the entire skull. In the Gorilla, the transverse measurement of the four incisor teeth is not greater than in the Chimpanzee: they are, therefore, proportionately smaller; and in this respect, although still very far removed, the Great Ape makes a nearer approach to human dimensions. A further deviation from human type is seen in the greater inequality of the incisors of the upper jaw, the central incisors being considerably broader than the lateral. This inequality is greatest in the Gorilla, but in both species it is a marked point of differentiation. Each incisor has a well-developed prominent basal ridge on its posterior surface; and the outer angle of the crown of the lateral, instead of being entire, as in Man, is rounded off. In the lower jaw, these teeth are equally characterized by their great size. As in Man, the lower lateral are broader than the central ones; but the former have the external angles of the crowns rounded off. In both jaws the direction of the incisive teeth departs greatly from their vertical or nearly vertical position in Man.

Genus *Pithecus.*—In the incisors of the Orangs we notice a still greater divergence from human type in the superior breadth of the entire series, in the greater size of the upper central teeth, and the greater amount of inequality between them and the lateral. The central incisor of the upper jaw in *Pith. Satyrus* and *Pith. Morio* is of unusual size and strength, being double the width of the outer one, whilst its thickness is nearly equal to its transverse measurement. From their constant use in overcoming the resistance of hard and tough vegetable substances they become worn down; and in the old Orang they present a broad abraded surface, which extends obliquely backwards from the cutting edge to the posterior margin of the base of the crown. The lateral incisors have their external angles obliquely truncated; in the lower jaw they exceed in transverse measurement the dimensions of the central. In the obliquity of their implantation in both jaws, they exhibit the ordinary Quadrumanous character.

Cuspidati.—In its conical shape, the human cuspidatus does not present an exception to the configuration of canine teeth generally; but its peculiar characteristics are its small absolute and relative size, and the absence of any difference in its development in the two sizes. It is more deeply implanted and possesses a stronger fang than the incisors; its external surface is convex, its internal is flat or sub-concave, and presents a slight prominence at its base.

Genus *Troglodytes.*—The canine tooth in both sexes is of greater relative size than in the human subject, but in the male sex it attains vastly superior dimensions. In the adult male of both species, the apex of the upper cuspidatus extends a little below the alveolar border of the lower jaw when the mouth is shut; in the female the apex is lodged in the interval between the lower canine and first premolar. The crown of the upper laniary in the male is pointed and of a conical figure; its external surface is convex, presenting a longitudinal depression anteriorly; posteriorly it is somewhat flatter, and is bounded by a sharp cutting edge: the internal surface is divided into an anterior and posterior facet by a longitudinal rising; the posterior is concave, and both it and the anterior are grooved longitudinally. In the male Gorilla the cuspidatus has a more outward direction than in *Tr. niger;* the anterior internal groove is deeper, and the internal ridge is more developed; the posterior internal groove is continued lower on the fang, and the posterior trenchant edge is more produced towards the base. The size of the canine in the male Gorilla is greater as compared with the incisors than in the Chimpanzee; in the male of both species it attains twice the size of the same tooth in the female. In length the enamelled crown of the superior canine in the adult male *Tr. Gorilla* measures one inch and four lines.

An equal sexual distinction is maintained in the dimensions of the canines in the lower jaw. The crown of the lower canine is conical and trihedral, its external surface is convex, and the two internal are flat or slightly concave, and converge to an almost trenchant edge. Anteriorly a ridge separates the external from the antero-internal surface. The entire length of the lower canine in the male Gorilla is two inches and a half, in the Chimpanzee two inches. The crown in the larger species is one inch and a quarter in length, and nearly an inch in breadth at its base; in *Tr. niger* it is three-quarters of an inch in length, and two-thirds of an inch across the base.

Genus *Pithecus.*—In the Orangs we find a like high degree of development attained by the canines, the same sexual difference, and the same general configuration. The laniary of the Great Orang does not, however, quite equal that of the Gorilla, either in length or breadth. The posterior trenchant margin of the upper tooth is moderately developed, but the anterior longitudinal depression which is present in the species of *Troglodytes* is absent. These two latter characters receive their highest expression in some of the Baboons; *e. g.*, the Mandrill (*Cynocephalus Maimon*).

Premolares.—In Man the crowns of the premolar teeth (bicuspides), in both upper and lower jaws, are, as their name implies, surmounted by two cusps or pointed tubercles. These teeth are of less relative size as compared with the true molars than in the Anthropoid Apes. The outer cusps of both premolar teeth are larger than the inner ones, and accordingly the outer curve formed by the premolar part of the dental arch is greater than the inner. In the upper bicuspid the outer and larger cusp is divided from the inner by a deep straight fissure or groove; in the lower bicuspid this fissure describes a curve concave towards the outer cusp. In some cases the curved groove in the lower premolar is crossed by a ridge which extends from the outer to the inner cusp. The inner cusp in the lower tooth is less developed than the same tubercle in the upper. The fang of the lower premolar is single, long, sub-compressed, and conical. In the upper jaw, although at first sight the fang of the premolar might be supposed to be single, an examination of the pulp cavity, which is bifurcated, shows that it really consists of two connate fangs, which frequently, by the groove on their surface, and by a bifid extremity, evince a tendency to separation.

Genus *Troglodytes.*—In the upper jaw, the premolars of the Gorilla and Chimpanzee are bicuspid, as in Man; but, besides their superiority of size, they differ in several other important particulars. The external cusp of the first premolar in both species of *Troglodytes* is larger than the inner, in the second premolar the inner is larger than the outer; in Man the external is the larger in both. This alternation in the size of the cusps of the premolars of the Chimpanzees corresponds with and contributes to the straight line formed by the whole grinding series; whilst the great size of the external cusp gives to the first premolar, when viewed from without, the appearance of being greatly superior in size to the second. Each premolar is implanted, like the true molars, by three divergent fangs, two external and one internal, which at their ends curve towards each other. Professor Owen states that in one female skull of *Tr. niger* which he examined, the two external fangs of the second premolar are connate, and in the specimen before alluded to (p. 438) a similar peculiarity was noticed; in these cases the first premolar presented the usual implantation by three fangs. In no variety of Man is the upper premolar normally implanted by three roots; the greatest approach to complexity observed in him is a partial division of the fang into two. In the lower jaw, the first premolar, when viewed externally, appears much larger than the second; in the Chimpanzee it is twice the size, in the Gorilla three times the size, of the same tooth in Man. Its crown is somewhat of a three-sided figure, the anterior and outer angle being produced forwards, and making an approach in this respect to the peculiar characteristic of the first premolar in the Baboons. It is surmounted by two trihedral cusps: of these the outer is the larger and higher, whilst the inner is feebly developed on a ridge extending transversely from the external cusp. A thick basal ridge belts the inner and posterior part of the crown. The second lower premolar is of a four-sided figure; its two cusps are placed on the anterior half of the upper surface of the crown; they are united by a transverse ridge, and a third smaller cusp is developed on the inner and posterior angle. Each lower premolar is implanted by an anterior and posterior fang: of these the former is the larger. They are divergent, and compressed antero-posteriorly.

Genus *Pithecus.*—In the Orangs we recognise the same complex implantation of the premolars by three fangs in the upper and by two in the lower jaw. The first premolar in the upper jaw differs from the same tooth in the Gorilla and Chimpanzee in having the anterior external angle of the base of the crown produced, an approximation to the configuration observed in the lower Quadrumana. The outer lobe of this tooth is a little larger than the inner one; in the second upper premolar both lobes are equal. The two cusps of the first are also more developed than the two cusps of the second. In the lower jaw, the outer cusp of the first premolar attains by far the greater dimensions; from it three ridges proceed, one to the front part of the grinding surface, one to the back part, and a third transversely inwards, where it developes a small tubercle. In the second lower premolar, the inner tubercle attains almost an equal size with the outer.

Molares.—Amongst the distinguishing features of the true molar teeth in Man, are their greater size in proportion to the jaw and in proportion to the other teeth, and the rounded contour of their grinding surfaces. In the upper jaw, the two first teeth of the molar series are quadricuspid. Of the four cusps, the antero-internal one is the largest; and it is connected with the postero-external by a low ridge, on either side of which is a deep groove, extending on the outer side to the middle of the outer surface, on the inner side to the inner surface. The connection of the inner anterior and the outer posterior cusps by the oblique ridge just mentioned gives a sigmoid character to the eminences on the grinding surfaces of these teeth. In the last true molar, which is the smallest of the series, the two inner tubercles are blended together; and in many instances a groove extends at right angles from the one separating the two outer cusps to the middle of the posterior border of the grinding surface. The upper molars in Man are implanted by three diverging fangs, two external and one internal; but not unfrequently in the second molar the two external are found parallel, and occasionally connate. In the third upper molar, the two external fangs are more commonly connate; and sometimes also the inner fang is blended with them. Owing to the slow accession of maturity in Man, and the long interval which elapses between the acquirement of the first and last true molars, the former tooth is found more worn in proportion to the other teeth of the same series than in the Chimpanzees and Orangs. In the lower jaw, the human molar is quinque-cuspid, the fifth tubercle being developed posteriorly, and connected with the postero-external cusp. The fifth cusp is, however, frequently absent in the second tooth of the series, and is most developed in the *dens sapientiæ.* A crucial depression separates and defines the four principal cusps, and by a bifurcation of its posterior branch includes the fifth. This bifurcation is most apparent in the third molar. As in the upper jaw, the last-named tooth is the smallest of the true grinders. Each molar is implanted by an anterior and a posterior subcompressed fang, which are grooved along their opposed sides. It is not uncommon to find these fangs more or less connate in the second and third teeth of the series.

Genus *Troglodytes.*—The straight line which the grinding series forms in the Chimpanzee and Gorilla is the difference which first attracts notice in comparing these teeth with those of Man. In the upper jaw, there is a slight inclination in the opposite direction to the well-marked curve which the molar teeth describe in the human subject. Another difference is the smaller relative size of the grinders as compared with the incisors. In this last particular the Gorilla makes a nearer approach to Man than the Chimpanzee ; for in the former the molars are larger relatively, when compared with the incisors, than in *Tr. niger.* In the upper jaw, the first two molars, both in *Tr. Gorilla* and *Tr. niger*, correspond with the same teeth in the human subject, in being quadricuspid, and in having the inner internal and outer external tubercles connected by a low ridge. The sigmoid character thus given to the eminences on the unworn surfaces of these teeth is highly indicative of the superior position in relation to Man occupied by the Chimpanzees over the Orangs and lower Quadrumana, in whom the grinding cusps rise from the surface of the tooth distinct and unconnected. The third upper molar in *Tr. niger* is the smallest of the series, in consequence of the minor development of the two posterior cusps ; also the oblique connecting ridge between the antero-internal and postero-external cusp is either absent or feebly developed. In the Gorilla, the last upper molar differs from the same tooth, both in the Chimpanzee and in Man, in its greater size, being equal to the second except at the posterior part, which is slightly narrower, and in having both the posterior cusps, but especially the inner one, much more distinctly marked. The connecting ridge between the anterior internal and outer hind cusp is also present, but it is more transverse than the same ridge in the other molars. Each upper molar in both species of Troglodytes is implanted, as in Man, by one internal and two external fangs. These, we believe, have never been observed connate in any of the Anthropoid Apes. In the lower jaw, the three molar teeth of the Gorilla are equal in size ; in the Chimpanzee they are nearly equal, the first being only slightly larger than the last. In both species, the four principal cusps, and especially the two inner ones, are more pointed and prolonged than in Man ; but the fifth posterior cusp is proportionably smaller. The fifth cusp is present in the second tooth ; it is usually absent in the second molar of Man. The crucial depression which separates the cusps is much less distinctly marked, and does not divide the ridge connecting the anterior pair, as in the human lower molar. Owing to the great development of the fifth posterior cusp, the crown of the last molar is of longer antero-posteroir measurement. The implantation of these teeth resembles that in the human subject, except in the fact that the two roots of the second and third are never found connate in the Gorilla and Chimpanzee.

Genus *Pithecus.*—The true molars of the Orangs differ from the true molars of the Chimpanzees in their smaller relative size as compared with the premolars. Like the molar series in Troglodytes, they form a straight line in both jaws; and they have a similar implantation, by three roots in the upper and two in the lower jaw. In the superior series, the first and second teeth are furnished with four cusps; but they are less developed, and the depressions between them are shallower; the connecting ridge between the antero-internal and the postero-external tubercles is either absent or but very feebly developed, so that, as before stated, the sigmoid character of the elevated surface is not marked, as in Troglodytes; the whole grinding surface is flatter, and minutely wrinkled. The third molar is smaller than the first and second.

In the lower jaw, the first and second molars have three cusps along the outer side, and two on the inner. The last tooth of the series has two external cusps distinctly marked, but the postero-internal tubercle is but feebly developed. The unworn surfaces of the lower molars are, like those of the upper, minutely wrinkled. Lastly, it would appear that, in the Orangs, it is not very unusual to find a fourth supernumerary molar, sometimes in the upper, sometimes in the lower jaw, on one or both sides. It is worthy of remark, that supernumerary teeth occurring in the human subject are almost always, if not always, incisors or canines.

We have thus seen that the permanent dentition of the brute Ape indicates in itself, were there no other anatomical differences between them, an impassable boundary between his organization and that of rational Man. The great incisors and canines, the peculiar conformation of the premolars and their complex implantation, the straight line formed by the whole molar series, and the relative inferiority in size of the true molars as compared with the incisors—above all, the sexual differences in the development of the canines—constitute an assemblage of distinctions which no process of transitional transmutation of which we have any cognizance, no law of selection whose operations we are able to trace, are competent to obliterate. In briefly reviewing the differences which exist in the deciduous teeth of Man, *Troglodytes niger*, and the Orangs, we shall place other and even more significant facts in array against the hypothesis of transmutation; for the milk teeth are even farther removed than the permanent ones from extraneous influences, and they are formed at a period far too early in the life of the animal for the occurrence of deviation from the common primordial type.

The human milk incisors differ from those of *Troglodytes niger* and *Pithecus Satyrus* in their small size and the entierty of the outer angles of the lateral pairs. The canines differ in the less pointed configuration and inferior length of the crown, and in the absence of the sharp posterior edge in the inferior one. The crowns of the milk canines are also less obliquely opposed in the human subject, the direction of the inferior one being more advanced in the Chimpanzee and Orang. The first deciduous molars of man differ in the greater complexity of the grinding surface. In the upper jaw it is bicuspid, with a small posterior division notched off from the outer and larger cusp ; and the inner cusp is more developed than in the Chimpanzee. In the Orang and Chimpanzee it presents two simple cusps. In the lower jaw, the first human milk molar is quadricuspid, with a small anterior ridge ; in the Great Ape it supports one large pointed cusp and a posterior ridge. The second deciduous grinder in the upper jaw of these animals agrees in general configuration with the same tooth in Man ; but the second lower molar is quinque-cuspid in the human subject ; in the Chimpanzee the fifth posterior and external cusp is absent, and only a slight indication of it exists in the Orang.

Lastly, the order of succession of the permanent teeth presents this striking difference : In Man the canines and bicuspids come into place before the second molar, and the anterior part of the dental arch is completed long before the acquisition of the full grinding apparatus. In the great Quadrumanes the second molar is cut before the lateral incisors and premolars ; and the large canine comes into place the last of the dental series after the third molar. The small size of the canines and bicuspids in Man is doubtless the immediate circumstance on which depends the precedence of their evolution ; but it is most interesting to trace in the rapid completion of the fore part of his dental series an adaptation to the early perfection of those powers of speech and expression which are super-eminently his endowments ; whilst, on the other hand, the priority in succession of the true grinders in the frugivorous Ape is a provision in accordance with the necessities imposed by his coarser vegetable diet.

We have thus endeavoured to present to our readers the salient points which distinguish the teeth and maxillæ of Man from the corresponding structures in those amongst the inferior Mammalia which in organization approach him nearest. Our obligations throughout these papers to the labours of Professor Owen have been before acknowledged; but we cannot lay aside the pen without expressing our sense of the importance of the results elicited by his researches in the anatomy of the higher Quadrumana. The discovery of the identity of the immature Orang with the Great Pongo of Borneo, and of the *Homo Troglodytes* of Linnæus with the mature Chimpanzee; the investigation and comparison of their osteology and dentition; together with the later researches into the still higher development of Quadrumanous organization exemplified in *Troglodytes Gorilla*—have established the existence of a chasm between the physical part of Man and the irrational Ape which existing science is powerless to fill, and hypothetical reasoning can never bridge.

F. C. W.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

(From the 'Dental Cosmos' for July.)

A Monthly Meeting of the Association was held on the evening of June 12th, at eight o'clock.

President, Dr **Dillingham**, in the Chair.

Present, Drs Buckingham, McQuillen, Garretson, Fitch, Flagg, Barstow, Van Osten, Harris, Peirce, Roberts, Townsend, Hopkins, and Barker.

The President announced the subject for discussion to be the

"Treatment of the Dental Pulp."

Dr **Peirce** remarked, that before considering the subject of discussion for the evening, he desired to present to the notice of the Association an interesting case. About four years since he treated for Dr Barstow an exposed pulp, in first right inferior molar, removed the pulp and filled the fangs as perfectly as was in his power. The tooth subsequently became painful from periosteal inflammation, and was extracted; the pain, however, has not been alleviated by the extraction of the tooth, but still continues, appearing to be located in that portion of the jaw from which the tooth was removed. The pain is local, and of a paroxysmal character, being often induced by movement of the maxilla, but does not extend above the angle of the jaw. He would be glad to hear any suggestions for its alleviation.

Dr **Buckingham** remarked that he had frequently seen similar cases, and, indeed, occasionally suffered himself from neuralgic pain located in the right superior maxilla, from which all the teeth had been removed. He has found nothing that would permanently relieve the pain.

Dr McQuillen, after an examination of the mouth, suggested the removal of a filling, in the anterior approximal surface of the second inferior molar (adjoining the tooth that had been extracted), as it appeared to be defective, and there was a possibility that the pulp might be nearly, or quite, exposed under it. If this was not the case, the cause of trouble was no doubt somewhere along the course of the third branch of the fifth pair of nerves, as it runs through the bony canal of the lower jaw. Under such circumstances, should the pain become unendurable, relief could only be obtained by trephining the lower jaw and removing a section of the inferior maxillary nerve, an operation introduced by Prof. Pancoast for relief of facial neuralgia, and followed by the happiest results. He sincerely hoped, however, that the pain had its origin in the tooth referred to.

Dr Peirce was glad to hear the suggestions of the gentlemen, but did not consider the tooth referred to by Dr McQuillen to be the cause of the difficulty, as he had examined it very carefully.

He would now consider the subject for discussion, and remarked that he had never successfully treated an exposed pulp by the methods advocated by some practitioners, such as touching the exposed part with nitric acid, capping with gold or quill, and the many other modes that had been suggested to preserve the vitality of the pulp after exposure. The failure of these methods he thought due to the irritation of the pulp, induced before the case is seen, and often before the pulp is exposed, and if the tooth is filled while in such a condition, the pulp, from contact with a foreign substance, soon loses its vitality, the tooth is changed in colour, and will, eventually, be lost from periosteal inflammation, if not relieved by being thoroughly cleansed and fangs properly filled. He has therefore entirely discarded such treatment of the pulp when exposed, but if a thin septum of dentine protects the pulp, would bridge his filling, preserving the dentine from pressure, and the pulp from changes of temperature.

When the pulp is exposed, applies the arsenical paste, composed of arsenious acid, morphia and creosote. He was surprised to see, in one of the text-books upon dental surgery, a remark by the author that sulphate of morphia was useless and objectionable, and should be discarded. His judgment was directly the reverse, and considered it particularly valuable, as it arrests much of the pain which is induced by the application of the remedy, and thinks, where it is used and combined with the others in the proportion of two-thirds morphia to one-third arsenious acid, with creosote sufficient to make a paste, there is less liability to induce periostitis than with the old formula in which morphia is discarded.

The time to leave an application of the paste in a tooth must of course be influenced by the age and condition of the patient; usually, in adult teeth, allows it to remain twenty-four hours; after having removed the application, is in the habit of placing in the cavity a pledget of cotton, and allowing it to remain another day. His reason for so doing is in consequence of the greater facility with which the pulp can be removed, than where it is attempted immediately after the death of the pulp and the removal of the application.

Dr McQuillen remarked, as patients frequently present themselves to the dental practitioner, complaining of odontalgia, in which it is somewhat difficult to determine whether the pain is due to *actual expo-*

sure of the pulp, or the *inefficient protection* afforded to it from variations of temperature by a *thin covering of dentine ;* and as it is an incontrovertible fact, that the pulps of a great many teeth have been destroyed by applications of the arsenical paste, when they were not exposed, it becomes a matter of paramount importance that an *accurate diagnosis* should be formed prior to attempting any course of treatment.

In forming his diagnosis, he is guided by the following evidences :—

First.—The statement of the patient, that the pain is *severe* and *constant,* and increased by the pressure of foreign substances, particles of food, etc., in the cavity of decay (but not by the mere occlusion of the teeth) ; and becoming more *intense* toward, and during the night, owing to the nocturnal febrile exacerbations, that all persons are more or less subject to, as evinced by the flushed cheek and sparkling eye.

Second.—The visible exposure of the pulp, or if this is not accurately defined, the oozing of blood or serum from it (and not from the gum) into the cavity of decay. When the cavity is out of sight, a small piece of tissue-paper introduced by a pair of tweezers will determine the presence or absence of the blood or serum.

Third.—The plan adopted by the late Dr Townsend in doubtful cases, which, he believes, is as follows : If on packing a pledget of cotton into the cavity after the caries has been removed, the pain is *increased* and *continues* after the removal of the cotton, the pulp is exposed ; but should it *lessen* in a few seconds, and *eventually cease,* a thin covering of dentine will be found protecting it.

Fourth.—The *experimentum crucis,* touching the pulp with an excavator or a probe, removes all doubt of the actual condition of affairs. This, however, should always be avoided if possible, as it creates an intense and unnecessary pain.

If the examination should prove that the pulp is covered by a thin septum of dentine, the treatment should be prophylactic. To accomplish this, the mere introduction of a gold filling, however perfectly introduced, is not always sufficient ; for the variations of temperature to which the pulp is exposed by the conducting quality of the gold, is frequently quite as efficacious in destroying the pulp as the arsenical paste. Under such circumstances, he adopts a method suggested recently to him by Drs Dunning and Smith, of New York. Before introducing the gold filling, the sensitive dentine is covered with a *thin* layer of gutta percha, which, acting as a non-conducting medium, protects the pulp from the pernicious influences of depressed or elevated temperatures.

Should the pulp be found exposed, he has, with due respect to the opinions of those with whom he differs, but one course of treatment, and that is, to make an application of the arsenical paste ; for in all the cases where he has made careful efforts to preserve the vitality of *exposed pulps,* he has found it necessary eventually to remove the fillings, and apply the paste to a living pulp, or extirpate one already dead. And in addition to this, has seen cases from the hands of fellow-practitioners in which the same mode of treatment had been pursued with equally unfortunate results.

Before applying the paste he endeavours, by the removal of the caries, to make as thorough an exposure of the pulp as practicable, so that the application may be placed in direct contact with it. This paste, consisting of the well-known proportions of arsenic, morphia, and creosote, is introduced upon a pledget of cotton ; over this is placed a large piece of cotton, which completely fills the carious cavity. The patient is then dismissed until the next day, when the application and pulp is removed. The first step in the latter operation is to make the opening into the pulp cavity as large as possible. After this, introduces delicate and malleable broaches, either barbed at their sides, or with hooked extremities, and by *twirling* them in the pulp cavity, entangles and removes the devitalized structure. There is nothing, perhaps, in the practice of dentistry more deceptive than the impressions practitioners are liable to form with regard to the entire removal of pulps, for instead of extirpating them, they are frequently forced far up the fang, and even after the removal of what was conceived to be the entire structure, a careful investigation discovers a considerable portion still in the fang. Every one no doubt can recall such cases as these. The decomposition attendant upon such remains is, undoubtedly, one of the most fruitful causes of periodontis.

Having removed the devitalized pulp, after washing out the pulp cavity with a syringe, and then drying with tissue-paper, he endeavours, to the best of his ability, to *fill* the entire cavity *with gold-foil*, carrying the material as far into the *fang* or *fangs* as practicable.

A proper regard for truth would not permit him to claim the uniform success that some assert has attended their efforts. He had met with gentlemen who stated positively that they never had any failures. He is free to confess, however mortifying the acknowledgment might be regarded by some, that he has had failures. And when taking into consideration the idiosyncrasies, temperaments, and cachexiæ (the inflammatory, scorbutic, syphilitic, etc.), that patients labour under; and the fact that a tooth from which the pulp has been removed is not in the perfect physiological condition it was before that occurred, and is, therefore, *predisposed* to disease, particularly in the cachetic conditions referred to, and when subjected to an exciting cause, such as inclement weather,—he had reason to believe that all, and knew that many have their failures.

Dr Flagg considered it was of the first importance to be able to diagnose positively the existence of an exposed pulp, and was impressed with the truth of this position from having seen many cases that had been subjected to arsenical treatment for days and weeks, with a view to the destruction of a *supposed* pulp, when no such organ had been in existence for months and possibly years. Has tested for exposure, in various ways, and forms a diagnosis by the combination of various results; uses hot and cold fluids, and expects an immediate and painful effect from their application; occasionally touches gently with an untempered probe, and stated that he did not regard it as absolutely necessary to inflict much pain by so doing, provided it was done very gently—considering that it afforded the most positive indication of the best location for the pulp-destroying substance. He examined cavities which opened posteriorly, with mouth-glass, and probed by reflection, depending much upon an accurate knowledge of the relative positions and shapes of the various pulp cavities and fang canals; and, lastly, referred to Professor Townsend's method of pressing cotton into the cavity of decay, and if it produced pain, *which continued* for some seconds or possibly a minute *after*, the cotton was withdrawn—received that as very strong evidence of an exposed pulp. Has treated many cases of slight exposure with creosote, nitric acid, tannin, and various other proposed topical applications, but has yet to experience the *first case* which has withstood the test of from eighteen months to three years, the ordinary length of time required for the devitalization and disintegration of a pulp with the accompanying unpleasant symptoms. Has therefore abandoned the practice entirely. After diagnosing exposure, proceeds at once to destroy the nerve; and uses for this purpose the following: ℞.—Ars. Acid, Sulph. Morph., equal parts by weight; Ol. Creosot. q.s.; made into a soft paste by triturating them for at least three or four hours. These proportions had been used by his father and himself, and had satisfactorily stood the test of twenty-five years. He preferred a soft paste to the hard pill which had been recommended by some, in consequence of its greater facility of adaptation and the absence of mechanical irritation. Applies it upon a small piece of cotton, and requires the testimony of the patient that it touches the "sore spot," securing it in position by a cotton plug saturated with Sol. Sandarach. Pain usually supervenes, which continues with more or less violence for from four to six hours, with possibly another accession about twelve or fifteen hours after the application is made, which is usually of about half an hour's duration. Allows the paste to remain for twenty-four hours, subject of course to some modification dependent upon the age and temperament of the individual. Not unfrequently finds some pain attendant upon the attempt to extirpate the pulp, but removes this by an application of pure Acid. Nit. upon a gold wire; then drills into pulp cavity, enlarging the opening with burr-drills until he has an orifice the full size of the canal; removes what portion of the pulp remains in the cavity with fine barbed or square broaches, passing them gently as far as possible into the fangs, and turning them rapidly for a long time. Allows the hæmorrhage almost entirely to cease, washes the cavity by syringing, and then carefully fills the canals, as far as possible, with a fine thread of cotton saturated with creosote; employs this as a styptic and slight stimulant to remove any tendency to congestion from undue irritation. Fills pulp cavity and cavity of decay with cotton and sandarach plug, and allows it to remain one week if possible. All is then removed, and, whenever practicable, the fang is filled solidly to the apex with gold or tin foil dipped in creosote; and experiences an *innate satisfaction* that it can only be removed with the utmost difficulty. When not practicable to fill to the end of canal, introduces a small piece of thread with creosote, and allows it to remain, filling over it and compacting with foil. Considered that the fangs of both upper and lower incisors and cuspidati; first and second bicuspids, lower; second bicuspids, upper; palatine fangs of superior molars; lateral or posterior fangs of lower molars, and buccal fang of superior first bicuspids, should always be thoroughly cleaned and filled. The palatine fang of first bicuspid superior, buccal fangs of superior molars, and mesial or anterior fangs of inferior molars, should be partially filled whenever practicable.

Dr Fitch said, in some respects his remarks would be a repetition of those made by gentlemen who had preceded him. In reference to the preservation of exposed pulps by capping, cauterizing, etc., he must be permitted to say, that in consequence of non-success with all of these modes, he had abandoned the practice some five years since. The preservation of the pulp of a tooth is of the greatest consequence, and it should not be sacrificed whenever it is possible to save it; but, while this is true, he had little if any confidence in the means usually employed for its preservation after exposure. There are gentlemen who profess to have had success in the use of these means; yet he was disposed to doubt that it was very general. All present would readily admit that metallic fillings, or indeed any material placed in contact with the nerve tissue, would produce sufficient inflammation from pressure and changes of temperature to eventually destroy it. Operators, therefore, are not safe in cauterizing or capping, from the fact that these influences will, in the hands of most dentists, continue to operate upon the pulp, owing to some unavoidable imperfection in the plug, or the moving of the cap. It is true, success does now and then attend an operation of this kind ; yet he was disposed to regard it as little more than temporary. A tooth in his own mouth proved that a pulp might die years after being filled, from very slight causes. The pulp sloughed some eight years after plugging ; the tooth was healthy at the time the operation was performed, was slightly sensitive, but was not troublesome after it was filled during the eight years, up to the time of the death of its pulp. At this time it became painful and extremely sensitive to the touch ; upon the removal of the plug, the fangs were found filled with pus. He was inclined to question, in some instances, the formation of secondary dentine, as in this case the changes produced by the presence of the gold in the cavity, eight years after its introduction, destroyed the pulp. In diagnosing to ascertain the exposure of the pulp, usually employs the methods mentioned by Drs McQuillen and Flagg. Having ascertained this fact, he proceeded to remove the decay of the tooth, cutting first around the point of exposure, and lastly removing the decay directly from the pulp as lightly as possible, yet having a definite portion exposed. Applies to this surface a very small piece of cotton, previously touched to the arsenious paste, which is formed of two parts of morphia to one of arsenic by weight, rubbed in with creosote to form a paste of the consistence of cream. This is left in the tooth, protected thoroughly from the secretions of the mouth, from 12 to 20 hours. On removing the preparation, usually finds the pulp partially alive ; then, if not painful, which is usually the case, removes the bulbous portion of the pulp and places into the cavity a piece of cotton saturated with creosote, leaving this in the tooth usually about two days ; at the expiration of which time, finds the pulp in a condition to be removed from the fangs ; and with a barbed broach thrust to the apex of the fang, or as far as possible, with a rotary motion draws forth the dead pulp usually entire. After thus depriving the tooth of its devitalized pulp, introduces more creosote to allay any existing inflammatory action, leaving it in the tooth as long as circumstances require. The fangs being thus prepared, and the tooth free from pain and soreness, proceeds to plug them with gold ; and to accomplish this, generally uses broaches in the following manner : having prepared or armed ten or twelve jeweller's fine broaches adapted to the size of the root canal to be plugged, by winding them with gold, dries the fang, carrying the broach thus armed to the very apex, being careful not to run it through the foramen of the root ; with tweezers holds the gold *in situ*, and draws out the broach. If the gold thus introduced is the proper size, the foramina is closed at once ; then with a delicate annealed steel follower or plugger, of a size easily passed into the fang, pushes the gold just introduced to one side, carrying it into the canal as far as possible. This gives space for another broach ; thus he proceeds until the fang is filled. Plugs the main cavity, and burnishes, and seldom has any trouble after fangs are thus treated and filled. Never thinks of removing a fang filling ; and, indeed, it would be difficult to do so, if desired, after they are properly filled, unless it be the incisor roots. Occasionally finds certain fang canals so small that it is exceedingly difficult to pass into them the finest broach ; in such cases did not apprehend any unhappy results if left unfilled.

Dr McQuillen remarked, when we take into consideration that the merest scratch may induce an erysipelatous inflammation or a tetanus, that may eventuate in the death of the individual ; and on the other hand, that in many instances two or three limbs have been severed from the body, and the patients survived the dreadful ordeal,—we have presented not only striking evidences of the morbific tendencies of some, and the wonderful recuperative powers of others, but we have the most satisfactory proof that he must be, indeed, a wonderful exception to the rule, who can truly claim an invariable exemption from periostitis, alveolar abscesses, etc., as sequences to the treatment of the dental pulp. A quack might, but no physician would assert that his treatment of disease is uniformly successful. The surgeon candidly confesses, prior to commencing an amputation, the removal of a cataract, or performing any of the operations in surgery, great or small, that he cannot say positively what the result will be ; and as freely admits that his efforts sometimes proved unsuccessful. It would be well, therefore, for the dentist, operating as he does upon the same organisms, to take as broad a scope of observation, and imitate the candour that characterizes the medical and surgical practitioner.

Our successful efforts return, encourage, and often beget an overweening confidence in our own superiority and infallibility, and our failures, which if they were presented to our notice, might teach us a lesson, and induce a proper feeling of humility, pass into the hands of fellow-practitioners who, if questioned with regard to such matters, perhaps would tell us a different tale from what we anticipate. He certainly could afford such information to some who had asserted in his presence that they never had failures. As an evidence that even when the greatest care is exercised by the most thorough and skilful, failures may occur, he had before him a member of the Association who had lost two or more teeth treated by one who, as a practitioner, justly ranked as high as any one living or dead that has been engaged in the practice of the profession. It is but just, however, to add that the patient labours under an apparent predisposition to erysipelatous inflammation, and that the operator never made the ridiculous assertion that he had no failures, but, on the contrary, frequently acknowledged that he was far from being immaculate.

While making such statements, he wished it to be distinctly understood that success, in nine cases out of ten (if, indeed, the average is not a great deal higher), is sufficient encouragement to convince him that the destruction of exposed pulps is a justifiable operation. And with regard to the subsequent treatment, desired to be regarded as advocating the most thorough and radical fang filling, and opposed to the half-way measures advocated by some, of not filling the pulp cavities at all ; and by others, of introducing the filling so loosely that it may be drawn out when necessary. He said this in all kindness to those gentlemen, acknowledging at the same time the *right* they possess to entertain, advocate, and pursue the mode of practice that may appear best in their own sight.

(To be continued.)

COLLEGE OF DENTISTS OF ENGLAND.

DR RICHARDSON'S LECTURES ON ANÆSTHESIA AND ANÆSTHETICS.

(Reported by Mr JOHN DRISCOLL, Associate of the College of Dentists.)

LECTURE II.—TUESDAY, MAY 8, 1860.

ON SUBSTANCES CLASSIFIABLE AS ANÆSTHETICS.

DR RICHARDSON, after recapitulating the subjects he had described in his last lecture, proceeded to take into consideration *Carbonic Oxide* (CO).

In the first place, we are struck by the simple nature of this substance: it is composed of two elements, carbon and oxygen. In the second place, we are struck by its resemblance in number of elements to nitrous oxide, the difference being that carbon takes the place of nitrogen. But chemically there is a very great distinction between the two bodies. Carbonic oxide is not soluble in water, is inflammable in air, and stops combustion. In the first and last of these effects it is thus diametrically opposite to nitrous oxide. It is sometimes discharged from burning coal or coke, and there are instances on record of great danger to life having occurred on such occasions.*

Carbonic oxide has a slight faint smell. Dr Richardson stated that he had spent several weeks, in company with Dr Snow, in trying experiments with this anæsthetic. They found that from 1 to 3 per cent. of it would produce anæsthesia in about seven minutes, and that 5 per cent. would produce the same result in about five minutes. Dr Richardson then proceeded to illustrate the effects of the gas on a Guinea pig, employing 10 per cent. in this instance to produce the desired result speedily; the animal was completely narcotized in two minutes. After the experiment was over, he mentioned that the gas was not of much use in surgery at present, owing to its being inapplicable, even with a complicate apparatus, to the human subject. If it were more practicable, it would be one of the best anæsthetics, as it produces no convulsions, but little sickness, and no after effects. He thought that eventually some apparatus might be invented for the purpose of its inhalation. In all cases it is highly necessary to watch the effects of the gas upon the animal very closely, as death will quickly follow the narcotized state if the animal be not speedily removed from the narcotic.

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* See a very interesting record at page 33, vol. ii., of the 'Sanitary Review,' edited by Dr Richardson, in a paper by Dr John Davy, M.D., F.R.S., entitled, 'A Case of Coke-poisoning in a Church from the noxious effects of effluvia from a coke fire escaping into a church during Divine service.'—[J. D.]

The Fumes of Burning Lycoperdon giganteum.—Lycoperdon is also called *Lycoperdon Proteus.* It is a fungus commonly known by the name of puff-ball or devil's snuff-box. Children in the country amuse themselves with it, blowing it into each other's faces as a powder. It has been known and used for many centuries for the purpose of stupifying bees, by burning it and making the insects inhale the fumes. The fumes throwing them into a narcotic state, the animals are overpowered, and their owners can remove the honey from the hive without destroying the useful little creatures. Dr Richardson was on a visit to Mr Henry Hudson, a Leicestershire surgeon, in the year 1853, and heard of this use of the fungus ; the idea struck him that the substance might be useful as an anæsthetic. He had a rat caught, placed it in a box, and subjecting the animal to the fumes of the burning Lycoperdon, found that it was rendered anæsthetic. He then tried various other experiments, and found that all animals were rendered insensible to pain by the fumes evolved by the burning fungus. Since then he has used it on no less than two thousand animals, and he has the honour of being the first to discover and introduce Lycoperdon as an anæsthetic. It is a question as to the reason why this smoke produces anæsthesia. At first he thought that carbonic oxide was formed and was evolved ; but, after repeated examinations, he was forced to come to the conclusion that this view was wrong. Dr Snow investigated the subject with that nicety and minuteness for which he was so celebrated, and came to the conclusion that carbonic oxide was not the narcotic agent. Mr T. Herapath, after repeated examinations, came to the conclusion that carbonic oxide was the agent ; but it seems evident again that he was misled. Dr Snow at the time of his death seemed to have the idea that a cyanogen compound was the narcotic ; but Dr Richardson doubts this, and at present cannot decide what it is. All that we know for certain is, that the narcotic contains carbon, hydrogen, oxygen, and nitrogen ; but in what proportions these elements exist we still remain in doubt. The smoke of the fungus is one of the best anæsthetics for animals. Dogs will sometimes remain under its influence for three-quarters of an hour ; and a peculiar circumstance connected with its administration is, that often the fore limbs will remain sensitive while the hinder ones are completely narcotized. Dr Richardson inhaled the fumes himself, and retained consciousness while Dr Snow pricked him with a point in different parts of his body, but he had no sensation of pain. This anæsthetic is nearly impossible to use for inhalation by the human subject, owing to the apparatus required. The fumes have an unpleasant odour, but that may be removed by washing them with potash ; the narcotic they contain is insoluble in water, alcohol, and all acids ; it forms a very good local anæsthetic, and would be very useful to the Dentist for easing toothache from exposed pulp. Dr Richardson has smoked the fumes with success for that affection : he has also applied them with complete success in a case of a severe whitlow ; the affected finger was held in the fumes, and immediate relief was afforded. He had also given relief in a similar local manner in a case of irritable ulcer. Latterly a London charlatan has been using the smoke of the fungus in cases of chest disease. Lycoperdon in the form of solid fungus may be eaten for food with impunity; in Italy it is considered very nutritive. Dr Richardson has eaten it, and considers it both nutritive and palatable, similar in flavour to asparagus. The fumes are tasteless, and stop combustion : their narcotizing effects were shown upon a dog ; the animal was reduced to a state of unconsciousness in about four minutes.*

Smoke of Burning Opium.—Opium has been known for ages, much longer than Lycoperdon : in China and Japan it has been smoked for many centuries, without any immediate danger from its effects ; for, as soon as the narcotic state comes over the smoker, the pipe falls from his mouth, thus preventing him from inhaling too large a quantity of the fumes ; and no one, not even the youngest amateur, has been known to die from the immediate effects of smoking it. It is an excellent anæsthetic. Dr. Richardson has taken it himself on two or three occasions, and would personally prefer it to chloroform. Its narcotizing effects were illustrated by an experiment on a dog on this occasion. The effects of this anæsthetic vary in time : sometimes an animal is rendered senseless (by inhaling the fumes) in ten minutes, and at another time the fumes have been taken for three-quarters of an hour before the same result has been produced. Morphia burned, and the fumes inhaled, produces the same conditions as opium. The fumes have rather a bitter taste, and stop combustion : for this last reason, opium is very difficult to burn, as it puts itself out. The narcotic agent is insoluble in water, but slightly soluble in alcohol. The agent producing anæsthesia is undecided. The Lecturer has the honour of being the first to suggest opium-smoke as an anæsthetic in surgical operations. The difficulty of administration is its great drawback.

Dutch Liquid ($C_4H_4Cl_2$) has been known nearly forty years. Its action is very similar to chloroform. It has a sweet taste ; is insoluble in water, and is inflammable in air. Dr Snow, Mr

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* For a more detailed account of the properties of Lycoperdon, see a paper on the anæsthetic properties of the *Lycoperdon Proteus*, read by Dr Richardson before the Medical Society of London, on Saturday, May 20, 1853, and reprinted from the 'Association Medical Journal' by T. Richards, 37 Great Queen street.—[J. D.]

Bullock, Mr Morgan, and others, have made it. It takes about the same time in producing effects as chloroform. Dr Snow once thought that it was better than chloroform, and that it would supersede it; but he altered his opinion afterwards. There are some that still think it safer than chloroform, and argue that there is not so much taken in in respiration. Mr Nunneley of Leeds says that it is quite safe when there is no excess of chlorine; and that when animals have died under its influence, it has been through using impure liquid. He has performed six operations on the breast in the human subject, and an amputation of the thigh, successfully with its aid; and he has administered it to from two to three hundred animals, and never found it cause sickness. Dr Richardson has used it in very few cases. In the present instance a Guinea pig was subjected to its effects with perfect success.

Olefiant Gas (C_2H_2) may be made from Dutch Liquid: it is very inflammable, and slightly soluble in water; it has a pungent odour, and a garlicky smell; it requires 20 per cent. of this gas to produce anæsthesia. In one experiment that Dr Richardson performed, he administered 10 per cent., and no apparent effect was produced, with the exception of embarrassed breathing. In the present instance, its effects were shown on a Guinea pig, and 50 per cent. of the gas used, to render the result more speedy. As a rule, there are great objections to the use of this anæsthetic, as the experiments are generally fatal when complete insensibility is produced.

Chloride of Ethyle (*the Monochloruretted*, $C_4H_4Cl_2$) is a colourless liquid, similar to chloroform. It is insoluble in water, but soluble in alcohol; it was first introduced by Dr Snow, but the great difficulty of getting it pure prevented its general use. There was no sample of it at this Lecture, and consequently no experiments. There was one pure specimen made in Paris, and Dr Snow succeeded in getting a pint of it. Dr Richardson tried some of this, and found it similar to Dutch Liquid in its action. Dr Snow used it in many cases at King's College Hospital, and was generally satisfied with its results. It very rarely produced sickness.

Carburetted Hydrogen Gas (CH_2), "not the common coal-gas," was suggested as an anæsthetic by Mr Nunneley: it produces anæsthesia by "negation;" it requires above 25 per cent. to produce narcotism, and the result is not very good, as a severe headache is caused when the gas is breathed any length of time. Its narcotizing properties have been known many years. It is colourless, insoluble in water and inflammable in air.

This anæsthetic concluded the list on the table; but, considering that we cannot advance without a clear knowledge of things, Dr Richardson had put down a few more on the "black board," introduced by Mr Nunneley and others, as well as some mixtures of different anæsthetics.

Sulphuretted Hydrogen is a very powerful anæsthetic; one part in four thousand will produce anæsthesia. It is a poison, and always causes death when complete insensibility is produced.

Chloride of Carbon is analogous to chloroform; but it is of no use, as chloroform is better in its results.

Ethers—Acetic, Chloric, and Nitric—have been tried, but have no great quality to recommend them.

Analogues of Chloroform, as Iodoform and Bromoform, have been tried, but are deficient in certain physical and necessary properties.

Other gases, as hydrogen and coal gas, were named. (The same remarks that were applied to the ethers will apply to these also.)

A Mixture of Chloroform and Ether, called the *Vienna Mixture,* was noticed at some length. This mixture is made by mixing eight parts of ether with one part of chloroform in hot weather, to six parts of ether with two parts of chloroform in cold weather. It was first used in Vienna, and was so much approved of there, that a local law was passed that it should be the only anæsthetic used. It is said that this mixture has been applied in thirty-three thousand cases in Austria without a single fatal result. Dr Richardson has used it himself in several cases, and considers that it has not any advantages over ether or chloroform uncombined. It is stated that it does not produce sickness; but in one instance where Dr Richardson administered it at the request of Mr Spencer Wells, it produced as extreme vomiting as he had ever seen. The great argument, however, against its use, and against the use of mixtures of every kind, is the fact that there are two distinct boiling points in such compounds. If we refer to the table, we find that ether boils at 96° Ft., and chloroform at 141° Ft.; and as these compounds remain chemically separate, and do not mingle except mechanically when brought together, the consequence is that the most volatile compound is first inhaled by the patient, and then the least volatile is inhaled; a circumstance not to be desired, and frequently productive of danger to the patient. These remarks concluded the second Lecture.

LECTURE III.—TUESDAY.

PHYSIOLOGICAL EFFECTS OF ANÆSTHETICS.

Dr Richardson commenced his lecture with remarks upon the physiology of the nervous system. In that system we treat of sensibility and sensational force. It is by it that we feel external impressions; and if we take into our contemplation every dominion of science, we shall find no grander study than this. It introduces us to the gate of life itself. It is most interesting to trace the development of the nervous system in the different animals, from the lowest up to man, in whom we find its grandest and most complex organisation. The Lecturer at this point gave an outline of the nervous system in its gradations, illustrating his remarks from a series of elaborate diagrams: he then went on to consider the relative meanings of sensation and consciousness, explaining that we must not confuse sensation and consciousness, as there is a great difference between the two phenomena. If we study sensation from its most simple to its most elaborate parts, we find that it is not absolutely essential to life; for that life can and does go on without common sensation, we have proofs in the vegetable kingdom, and in those animals that form the lowest families of the animal kingdom, and constitute the connecting link betwixt the two kingdoms. In these living, truly living structures, we may find both circulation and digestion going on without sensation. The nerves, therefore, though a part of certain living structures, are not themselves necessary to life in the abstract. Consciousness we find only in the highest animals, and as we rise in the animal scale its development through the nervous system attains its greatest height. In insects the brain is but a series of elementary ganglia or conglomerations of nerve matter, with a chain of ganglia extending the whole length of the body, forming a nervous system perfect as regards the wants of the animal, but imperfect when compared with the systems of the higher animals. With regard to the sensation of pain felt by insects, our knowledge of their nervous systems proves to us that it cannot be very acute; there is no doubt whatever that they do feel pain, but not to the extent imagined by Shakspeare when he wrote,

> "And the poor beetle that we tread upon,
> In corporal sufferance feels as great a pang
> As when a giant dies."

In fact, we must regard this sentence in the light of a poetic licence. It is very interesting to examine and compare the various nervous systems, to observe the beauty of the development, each portion, as it were, fitted and arranged according to the exact wants of the animal. In birds we find that the portion of the brain called the optic lobes, from whence proceed the nerves of sight, is very largely developed, giving to the creature very great powers of vision. In some fish we find the same. In animals of the chase, the olfactory ganglia are largely developed; in fact, as we advance in the scale, we find the nervous system gradually rising and perfecting until we come to man.

Dr Richardson then went on to state that in man the nervous organisation is divided into two great systems; a first, called the *Cerebro Spinal System* (comprising the brain and the spinal cord, and the several nerves given off from those parts, including all the nerves of special sense); and a second, the *Sympathetic System*, or the system of organic life, consisting of a number of ganglia, not enclosed all in bony cases as the ganglia of the cerebro-spinal system are, but extending from the skull to the bottom portion of the sacrum, and supplying the lungs, the heart, and the stomach. By this system, digestion, secretion, the action of the heart, the bowels, and the involuntary acts of life are mainly affected, all the acts performed by it being involuntary. The brain, the centre of the cerebro-spinal system, on the other hand, governs thought, and all animals in any portion of the animal kingdom have the power to think and to act from the brain. When the brain is injured, loss of consciousness is the result, but not necessarily loss of life. This is proved by a case which came under the notice of Sir Astley Cooper, in which a patient, with the brain injured and consciousness suppressed, recovered after operation. It has also been proved by the celebrated experiment of Dr Wilson Phillip, who took a puppy and removed the brain, leaving the medulla oblongata intact: the animal lived, or rather existed, many months; it had no sense; it would walk either backwards or sideways, and it ran over everything in its way: in short, it lived as a mere vegetable, but it lived. We may accept, then, as an acknowledged fact, that any deficiency of brain, any foreign substance interfering with the brain, or any great injury to it, may produce unconsciousness, but not death of necessity. Dr Richardson then briefly described the structure of the brain, describing its various divisions into cerebrum, cerebellum, medulla oblongata, &c., the last-mentioned portion governing the nerves of respiration. He next proceeded to describe the spinal cord, its functions, and the nerves given off from it. Sir Charles Bell was the first to prove, by direct experiment, the functions of the spinal cord and its nerves: he (Sir Charles) showed that by dividing the anterior nerves we produce paralysis of motion, and by dividing the posterior nerves (which have ganglia) we destroy sensibility, and by dividing both nerves, or by dividing the spinal cord, we produce the destruction of both motion and sensibility below all those parts to which the nerve or cord was distributed. From the foregoing observations, it would be seen that consciousness and sensation were closely allied, but sensation was not without a distinction. What, then, is the distinction? Let us see. When the brain is removed, both consciousness and sensibility are lost; and for that reason the old practitioners imagined that all the phenomena of sensation came from the brain. The arguments they adduced in support of that theory were, that when a man is stunned by a blow or an electric shock, he feels no pain, because an immediate effect upon the brain is produced. This is true, but it is now found that sensation can be destroyed locally. Thus, if we inject a narcotic into an artery, it will find its way to the extremities of the artery, and there produce loss of sensation, although the brain is not influenced. It is clear, therefore, that the blood has as great a share as the brain in producing local sensation. The blood, in fact, produces a local force, the nature of which is not understood, which force is transmitted along the nerve cords to the brain. On this view, then, sensation is a local act communicated to the brain: consciousness implies an appreciation of such act, but is not the source of it. Consciousness cannot be injured without an interference with sensation, but sensation may be arrested without any interference with consciousness. This description led naturally to the question, how do narcotics produce their effects? The most reasonable theory is, that narcotics effect their changes primarily through the blood. We know that without blood there can be no sensation. This is proved by a variety of experiments—by placing, for instance, a limb (except the extremities) in an air-tight boot, and exhausting the air by means of a double-acting piston, thereby drawing all the blood from the extreme parts. (Dr Richardson exhibited a boot of this description, and explained its action.) The benumbing effects of cold will produce a similar result. The Lecturer then related a curious and interesting experiment he had performed upon a donkey, by way of proving that anæsthetics produce their effects by the agency of the blood. He inserted a tube in the femoral artery of a donkey, and injected chloroform into the blood: the leg of the animal was narcotised long before the chloroform had in any way affected the brain; afterwards the whole of the animal was narcotised. This simple experiment proves the fact that anæsthetics produce their effects by acting through the blood, and interfering with the nutrition. What the local change induced by the narcotic is, it is difficult to say: it may be termed catalytic, but that is a word which we must dwell upon for a short time. Dr Snow has the honour of being the first to discover the remarkable property of anæsthetics, that they arrest oxidation. Thus, if a piece of red-hot iron be immersed in oxygen charged with vapour of chloroform, the iron does not glow; the chloroform, however, undergoes no change: even phosphorus, while it is kept in chloroform vapour and oxygen, is prevented from oxidising. Thus the presence of one body may prevent the chemical union of two other bodies which have affinities, the third body remaining the same; and such a process is called "*catalysis.*"

Now, Dr Snow having shown first that chloroform produces this catalysis in relation to oxygen and oxidisable bodies, argued that when chloroform was received into the bodies of animals, it produced in the extreme parts of their tissues this catalysis; that there it resisted chemical action, and the result was anæsthesia. There was up to this time no other hypothesis which at all approached this in probability. Bearing on this point, the Lecturer remarked that Mr Nunneley had shown the curious fact that carbon formed a constituent of all anæsthetics; and if we examine the list of the component parts of the various anæsthetics, we find that to be the case with but one exception—viz., nitrous oxide, which, however, is not a true anæsthetic, as it produces narcotism by negation or cutting off of air. Mr Nunneley's observation is one of considerable value.

In conclusion, Dr Richardson recommended the study of anæsthetics to the attention of all students; for although he had given the most modern theories as to which were the best anæsthetics, and why these substances produced anæsthesia, still he felt certain that much yet remained to be discovered, and it was highly probable that better anæsthetics than we yet possessed existed, waiting only for the Chemist to discover them, and bring them to light.

College of Dentists.—The following are the names of gentlemen to whom Certificates of Membership have been granted since the publication of the List of Members in July last:

Brooks, Robert Heygate, Banbury, Oxon.
Bullin, Frederick, Chester.
Comley, William, Stoke Newington.
Dagnall, Edward, Oak terrace, Battersea.
Durant, Frederic, Dorking.
Greenfield, Henry, Mortimer street, Cavendish square.
Heath, Thomas Weatherhead, Richmond, Surrey.
Jones, Alfred, Cambridge.
Karran, James, Douglas, Isle of Man.
Moseley, Gillam, Sheffield.
Penney, James, Lincoln.
Runting, William, South Audley street, Grosvenor square.
Skardon, John, Melbourne, Australia.
Young, James Anderson, Glasgow.
Young, James Hamilton, Glasgow.

Notice.—We are requested to state that the Conversazione announced for Tuesday, the 9th inst., is unavoidably postponed to Tuesday, the 23rd. This delay in opening the Session is owing to certain alterations connected with the apartments of the College not being yet completed. These alterations will not, however, interfere with the arrangements of the Metropolitan School of Dental Science, the Second Session of which will commence on Wednesday, the 10th inst., when the Introductory Lecture will be delivered, at 8 p.m., by Mr Hulme, the Lecturer on Dental Surgery.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—Mrs Jones having lately had a baby, I think it is a good opportunity to lay before your readers an account of the way in which Mr A. Stewart became one of the Examiners of the College of Dentists. It will form an appropriate appendix to Mr Stewart's publication of his letter of resignation in the last number of the 'British Journal of Dental Science,' in consequence, as he states, of Mr Harley's decease. Your readers cannot fail to perceive how closely these events are associated together: Mr Harley's death some five months after Mr Stewart's resignation, Mrs Jones' baby coming into the world a week before Mr Stewart gives the Profession the benefit of reading his important letter of resignation, and the insult which it contains to his former colleagues.

When the Metropolitan School of Dental Science was about to be formed, Mr Stewart was asked to take the office of Lecturer on

Dental Surgery: this he declined, on the ground that he did not feel himself competent to fulfil the duties; but, at the same time, he gratuitously added, he should be happy to act as one of the Examiners of the College of Dentists without fee or reward. Accordingly, this gentleman's name was added to the list of Examiners. Mr Stewart not only accepted office, but attended a meeting of the Council of the College of Dentists, and took an active part in framing the present Certificate of Membership.

Thus matters continued up to the time when the well-known Protest and Counter-protest made their appearance in the 'Times' newspaper. It would, however, appear from Mr Stewart's subsequent conduct, that at this period he began to have misgivings concerning the policy of the step which he had taken in associating himself with the College of Dentists. Knowing that his position had not been thrust upon him, but that he had achieved it for himself, it must be admitted that this gentleman had a somewhat difficult task to perform, when he wished to beat a retreat and belie the opinion which he had deliberately expressed, and continued to hold for the nine previous months during which he had been attached to the College of Dentists. In this dilemma, Mr. Stewart's conduct was certainly not that of a straightforward man; neither was it such as society usually expects from a gentleman. When called on with the Counter-protest for his signature, he made an evasive reply; when subsequently written to on the subject, he had not even the courtesy to return an answer. It was not until a month afterwards that he forwarded the letter of resignation, which he has now published after the lapse of five months. Not content with merely sending in his resignation, he has the impertinence and folly to tell those with whom he has been acting, that all the intelligence, &c., is on the other side. If this was the case previously, some persons will be apt to doubt it, now that the name of Mr Stewart has been added to the number. The vanity and meanness of some men are really beyond belief. I wonder what Mr Stewart has done, that he can possibly suppose the Profession should care to be informed that he has resigned the office of Examiner at the College of Dentists. Does he suppose that by this absurd proceeding he can do away with the fact that he did join the College of Dentists; or does he think that by following the policy of his illustrious countryman, Sir Pertinax MacSycophant, and that by boo-ing and boo-ing, he shall curry favour with that which he evidently supposes to be the winning party? I remain, Sir, your obedient servant,

VERAX.

I enclose my card, as a guarantee of the correctness of the above statement.

NOTICES TO CORRESPONDENTS.

All Communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," at the Publisher's, Mr H. BAILLIERE, 219 Regent street, W., NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

BOOKS RECEIVED.

The Dental Cosmos for September (in exchange).
The Dental Register of the West for September (in exchange).
The New York Dental Journal for July (in exchange).
The American Medical Times, Nos. 7 and 8 (in exchange).
The London Medical Review for August and September (in exchange).

THE

DENTAL REVIEW.

NOVEMBER, 1860.

THE COLLEGE OF DENTISTS AND THE OPENING SESSION.

All that malevolence, empty conceit, and vulgarity can bring against the College of Dentists has been brought—brought over and over again, each time with increasing spleen and meaner intention. It is all of no avail; the principle of independence is as untouched as ever. Scribblers, whose conversance with the mother tongue is not sufficient to allow them to write so much as a libel grammatically, may write, and one or two little Bourbons in Dentistry may pay the costs of the composition of their dependent *illiterati*, but it is still of no avail; dust may be thrown out broadcast by the collectors of the royal families in teeth-drawing to blind the world, but it comes back upon the distributors. In it all, the College of Dentists, holding by its colours, and, indeed, only opposed by a superficial barrier of pride, makes its way steadily on. The Medical Profession is with it, the public voice is with it, and the free-spoken and liberal section of the Dental Profession is with it: more in the way of support it cannot want, less in the way of opposition it need not require, seeing that as yet all the opposition that has been made has acted but as a background on which every good feature of the College has been thrown up, while every fault has been absorbed and concealed.

The opening of the present Session, the fifth of the kind, marks a period in the history of the Institution, a period when the preliminary, or, as the term technically runs, the provisional episode, is succeeded by perfect organization and permanent position. The Council could announce, on this occasion, that it had a fixed home for its members, that the new regulations had been found adapted to the necessities of the position, that the plan of examination for membership worked well, and that the number of members increased steadily.

It told, also, right pleasantly for the College on the occasion in question, that men are to be found who are prepared to show their attachment by something more than mere professions of allegiance. The magnificent prizes offered by Messrs Robinson and Tibbs, and which we have already announced indicate indeed a heartiness of good-will, and a determination to advance the great movement in hand, which cannot be over-estimated.

But that which crowns the efforts of the College, that which its supporters must needs look on with intensest satisfaction, is the entire success of its educational scheme. If the College had been the ephemeral thing which its enemies falsely represent it to be—if it were founded even against reason and principle, as its enemies pretend—it would yet have served a great purpose by its labours in the educational cause. To have instituted in the midst of persecution and the heat of political strife, when no two opinions were held by two persons, such a School as it has instituted; to have collected teachers at once zealous in their duties, and competent in the discharge of those duties; to have given the means to every honest, well-intentioned youth in the Profession to learn his profession, not merely as a mechanical art, but as a science intimately connected with the noblest sciences ; to have set such ones thinking of subjects that give the stamp and character of a manhood fitted for any intellectual sphere ; and to see that this endeavour is responded to in a manner which gratifies College, teacher, and learner alike,—is a triumph amply repaying to its promoters all the anxiety and the scoffs which they have been driven to endure. Let the would-be heads of the Profession, as they choose to self-nominate themselves, ask themselves the question, what they have done for their younger and less fortunate brethren in the same direction? We will not taunt them on the point, for that were to return their own play, but we may ask them, at least, whether their responsibilities are so well represented in protecting a publisher against the recklessness of libellous hirelings, as they would be, if transferred to the elevation of that professional standard of knowledge and honourable rivalry which the educational system of the College of Dentists, at the present time, almost exclusively upholds.

The College of Dentists of England, now consolidated, enters on this new Session with better days before it than it has yet seen. In its attempts at reform, it has accepted the broadest policy. It stakes its position, not on an obedience to existent prejudices, nor on personal compromises, but on the faith of an introduction into its future life of young, unbiassed working intellect—of intellect represented by men who, trained in independence, lured by scholarly friendships into unity, educated by early learning into strength, and sustained in principle by association, will identify the Institution that has reared them with their own lives, improve it by their labours, and consolidate it the more.

MEMOIR ON TUMOURS OF THE DENTAL PERIOSTEUM.

By E. MAGITOT, M.D.

(Read before the Chirurgical Society of Paris, April 13th, 1859.*)

Translated by Robert T. Hulme, M.R.C.S., F.L.S.

(Concluded from page 474.)

APPENDIX.

The Author having treated in the preceding Memoir specially of *Tumours of the Dental Periosteum*, considered it might not be uninteresting to place in an Appendix some observations upon the diseases to which the soft parts of the tooth are liable. These remarks have been taken from the Author's investigations on certain points of Dental Pathology which have hitherto been but little understood or examined; they will also be of service in diagnosing tumours of the periosteum.

These observations will be arranged under the heads of—1. Tumours of the Dental Pulp; 2. Polypus of the Periosteum; 3. Cysts, or Sub-periosteal Abscesses of the Roots.

Note A.—*Tumours of the Dental Pulp.*

PLATE, Fig. 6.

The tumours of the dental pulp have been previously noticed by Tomes† under the name of *polypus*, or *granulation of the dental pulp*, and by Dr Albrecht under the title of *hypertrophies.*‡ The latter, especially, has given a very accurate description of the anatomical characters of these tumours: the term hypertrophy, moreover, correctly indicates the structure of these formations, which are generally composed of the same elements as the pulp itself. We prefer, however, the less precise term of *tumours*, inasmuch as it does not predetermine the nature of the morbid growth, and at times other anatomical elements, besides those which belong to the healthy pulp, are found in those pathological formations of which it is the seat.

The tumours of the dental pulp are soft, fleshy formations, developed at the expense of the proper tissue of the organ, and projecting from its external surface. It is, of course, indispensable to their production that the pulp should have been previously exposed by the destruction of the crown of the tooth; these formations are therefore found, almost exclusively, in the interior of an extensive caries, which has penetrated the pulp cavity, and exposed that organ. The molar teeth, in consequence of the relatively large size of their pulp, are most liable to these formations. These tumours have a globular form, and are generally connected to the rest of the organ by a constricted portion, or *neck*, situated at the narrow orifice which forms the communication between the caries and the pulp cavity.

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* Baillière, Lond., 1860.

† 'A Course of Lectures on Dental Physiology and Surgery,' London, 1848, p. 275.

‡ 'Die Krankheiten der Zahnpulpa,' Berlin, 1858.

It arises from this peculiarity, that the entire morbid production has the form of a fleshy mass, composed of two lobes; one deep seated in the pulp itself; the other superficial, consisting of the tumour properly so called, and between the two constricted portions, or neck, which unite them together. Their volume varies from the size of a pea to that of an almond; their colour is white externally, and red or pinkish internally; their free surface is not mammalated, but regular and smooth. On the external surface, and especially at the interval which separates it from the caries, there are found the remains of food, vibrios, and that kind of filiform algæ which grows in the mouth. With regard to their microscopic structure, in all the cases which have come under the notice of the writer up to the present time, they are composed of an assemblage of nuclei similar to the embyro-plastic elements which constitute the greater portion of the normal pulp,* mixed with an amorphorus granular matter, and vessels and nerves. Only the nuclei are more voluminous; the fine layer of amorphous matter, resembling a proper membrane belonging to the healthy organ, is restricted to the surface of the tumours, so that these productions of the dental pulp may be regarded as consisting almost invariably of a simple hypertrophy, with hypergenesis of the normal elements of the organ. Such, at least, is what has hitherto come under the notice of the writer.

The symptoms produced by the disease are usually slight: in general the patients only complain of great inconvenience in eating on the affected side; so much so, that they are often quite unable to use it. In consequence of this, the teeth become covered with tartar, not only on the external surface of the crown, but also on the masticating surface, and even in the carious cavity which contains the tumour. The latter is painful when touched; it does not appear to be much affected by hot or cold fluids; but its soft surface frequently bleeds, sometimes spontaneously, and at other times from the contact of some foreign body.

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* For the anatomy of the healthy pulp, see the Author's work entitled, 'Etude sur le Développement et la Structure des Dents Humaines,' Paris, 1858, pp. 24 and 104.

Contrary to the opinion of Tomes, who considers that the extraction of the tooth is the only effectual means of treatment, the writer believes that the disease may be perfectly cured, and at the same time the tooth may be preserved. The treatment consists in first excising the tumour, which is to be effected in the following manner:

A curved, blunt-pointed bistoury is to be introduced between the tumour and the wall of the cavity; the pedicle is thus easily reached, and is to be divided by a single cut. The excision is followed by a considerable hæmorrhage, but which is easily arrested by the perchloride of iron. After this first stage of the operation has been accomplished, the remains of the pulp are to be destroyed. This may be done by the actual cautery, or, what the Author prefers, by means of caustics, particularly arsenious acid. For this purpose, a slight coating of the acid in the form of an impalpable powder is spread over a small piece of cotton; the first roll of cotton is protected by a second, and it is then left for twenty-four hours. On the following day, if necessary, the cauterization is to be repeated; and should symptoms of alveolo-dental periostitis arise, these must be allayed by the application of opiates. When the tooth is rendered perfectly insensible, it is to be stopped in the usual manner.

NOTE B.—*Polypus of the Dental Periosteum.*

PLATE, FIG. 7 AND FIG. 7 BIS.

The polypi of the dental periosteum, although belonging to the general class of tumours of this membrane, in consequence of their extra-alveolar situation, and, at the same time, of their special nature and distinctive characters, require to be described separately.

These formations belong to a series of complications or results which arise from dental caries. We have, in fact, constantly found them situated on teeth in which the caries, after having attacked the crown, had advanced to the neck of the tooth, thereby producing a kind of irritation at the terminal margin of the periosteum, and thus, in all probability, becoming the cause of the disease.

These polypi are situated almost exclusively on the large or small grinding teeth. They present themselves under the form of reddish spheroidal masses, having, on an average, the size of a large pea, with a mammalated surface, and almost always occupying the carious cavity of the tooth on which they are placed, while their pedicle is very slender, round, or flattened, and attached to the neck of the tooth. In consequence of this peculiarity, these polypi might at first sight be easily mistaken for tumours of the pulp: the readiest method of distinguishing between the two diseases is to examine the carious cavity by means of a probe. This examination will readily show whether the tumour is an expansion of the pulp, or a production of the periosteum.

The symptoms of this disease are very similar to those of tumour of the pulp; that is to say, they consist simply in great uneasiness in mastication on the side on which the disease is situated, and sometimes in acute pain, produced by the shock of a foreign body on the tumour, which then bleeds more or less freely.

Histologically, polypus of the dental periosteum is composed either of the same tissue as normal periosteum, only in a state of hypertrophy, or of fibro-plastic elements, nuclei or fusiform bodies, and of simple fibrous elements; but we have not hitherto detected in these formations the presence of elements of a different order, such as epithelium, myeloplaxes, &c.,—elements which we have met with in the tumours, properly so called, of the periosteum.

This disease is not uncommon; we have ourselves met with a large number of examples, and have been surprised to find no description of this disease by any author.

These polypi, like the tumours of the pulp, appear to us to be capable of being permanently cured. The treatment consists in cutting off the tumour at its pedicle. The polypus then falls into the mouth, and in order to guard against its return, the remains of the pedicle should be destroyed by cauterization; the caries must then be stopped, either immediately, or after the necessary preliminary treatment.

NOTE C.—*Cysts, or Sub-periosteal Abscesses of the Dental Periosteum.*

Cysts, or sub-periosteal abscesses of the alveolo-dental periosteum (alveolar abscess, Tomes) belong to the class of inflammatory affections of the periosteum. They are characterised by a separation of the periosteum, and the formation of a cavity or sac, whose parietes are formed by the elevated periosteum on the one side, and, on the other, by the cemental covering of the fang.

The teeth which are liable to this disease are those which are much decayed, and are, in consequence, entirely deprived of their pulp, and of the vessels and nerves with which it is supplied. Sometimes the crown has entirely disappeared, and the tooth is reduced to the condition of a stump, projecting more or less from the jaw. The antero-superior teeth appear to be particularly liable to this affection, no doubt in consequence of their being more exposed to external influences, their being frequently attacked with caries, and, as a consequence, the facility with which they become the seat of alveolo-dental periostitis, which is, in fact, the primary cause of the disease.

The disease is usually situated in the neighbourhood of the extremity of the root, and most frequently at the apex itself, which is completely surrounded by the fibrous pouch.

Externally these cysts resemble a soft, oblong, flattened bag when they occupy the sides of the roots, but oval and elongated when they are situated at the apex. The fibrous wall which forms the envelope is usually thick and strong, smooth and whitish on the external surface, the inner surface covered with short irregular filaments floating in the fluid contained in the cavity. The other wall is formed by the cement, which is seldom healthy, but granular, uneven, and presents here and there irregular depression, indicative of the work of molecular absorption. When the sac occupies the apex of the root, this is surrounded by the fluid; but we have always found that the dental canal was obliterated, either at the apex, or in some part of its course. This peculiarity serves to explain the manner in which the cyst is formed; because so long as the dental canal is pervious, it offers an exit for the purulent fluid of the periosteum, and thus prevents an accumulation of pus in a closed membranous pouch.

The nature of the liquid slightly varies: most frequently it is white, purulent, sometimes mixed with blood, and contains in suspension various substances, such as fat-granules and cholesterine, as will be shown in a case which is afterwards described. With regard to the wall of the sac, it usually consists of fibrous tissue, mixed with more or less of fibro-plastic elements.

The etiology of these periosteal cysts is very simple: the remote cause is constantly dental caries, whose progress has greatly modified the vitality of the organ; the proximate cause is chronic periostitis, confined to the apex of the fang, and which has become the seat of an abscess, so that the pus produced on the deep-seated surface of the membrane, finding no external issue either through the dental canal or the alveolus, accumulates in a closed sac. The periostitis, however, is far from being constantly followed by the formation of a cyst; many other disorders may be the result, such as fistula of the gum or external integument, inflammation of the cheek, necrosis of the alveolus, &c. The cysts on the roots of the teeth merely represent a particular mode in which the periostitis terminates, presenting a special train of symptoms which we shall briefly examine.

At the commencement of the disease, the patients experience deep-seated lancinating pain, corresponding to the situation of the fang of the affected tooth. The pain is not continuous, but comes on at longer or shorter intervals; at first it is slight, and lasts but a short time, and in a few days entirely ceases, giving place to a period of ease which may last for weeks or even months. The tooth is always the seat of caries more or less advanced, involving the total destruction of the pulp, and, consequently, complete insensibility of the cavity; the gum during the periods of pain is of a dark purple colour, and pressure opposite the diseased point of the fang is painful; nevertheless the mucous membrane is not the seat of an abscess or a fistula, and its free margin is usually perfectly sound, which is contrary to what happens in the case of tumours properly so called. Generally speaking, the cheek has a red spot opposite the disease, and the least pressure on the part produces fresh pain. Percussion of the tooth often produces no pain whatever, and except from the purple colour of the mucous membrane and the physical condition of the tooth, the nature of the disease could only be inferred from the symptoms which are experienced by the patient. These, which during the first attack are slight, are generally increased in intensity in the subsequent attacks, so that the pain, which is always deep-seated and lancinating, may become unbearable. The cheek presents no fluctuation, and the local disturbances in the neighbourhood of the diseased periosteum appear to be the result of distension and the temporary congestion of the sac.

The progress of the disease is usually slow, and is seen to consist of a series of attacks alternating with periods of repose, but whose intensity gradually increases. The consequence is, that several months, and sometimes even a year, may elapse between the first attack and the time when the patient seeks the assistance of the Dentist. The formation of a cyst on the fang of a tooth appears to us, therefore, to depend, not upon acute periostitis, as supposed by Tomes,* but on a slow and chronic periostitis, limited to a portion of the root of a tooth which a previous caries has, so to speak, transformed into a foreign body.

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* Opus cit., p. 278.

The treatment of this disease, as will be readily supposed, consists in the extraction of the diseased tooth. The operation presents no further difficulties than those which are usually met with in the case of teeth which are extensively decayed. In some cases, however, where the cyst has occupied an antero-superior tooth which has been stopped, and whose loss would have been more than usually inconvenient, we have easily obtained a cessation of the acute symptoms by the application of one or two leeches on the part of the gum opposite the affected root. This plan speedily relieves the pain, and the repetition of it on the occurrence of an acute attack may postpone for a long time the extraction of the tooth, but this is ultimately necessitated by the progress of the local changes: moreover, the repeated application of leeches to the same point of the gum sometimes produces a fistula of the gum, which arises from an opening in the sac corresponding to the part which has been bitten. In consequence of this, the contents of the cyst are constantly discharged until the sac becomes obliterated and the deep-seated disturbances in the alveolus entirely cease, giving place to the comparatively slight inconvenience of a small fistula, which is either permanent, or preceded by the frequent reproduction of small abscesses.

Case.—*Purulent Cyst developed on the root of the left upper canine filled with Cholesterine.*—(June 19, 1859.)

Madame B., aged thirty-nine, of a good constitution, has already lost several teeth, which had been extracted in consequence of caries (first left upper bicuspis, first right lower molar). The left upper canine began to decay at twenty years of age, and its crown was gradually destroyed without producing pain. For several years this tooth had been reduced to a mere stump, and had remained perfectly indolent, until about a year ago, when Madame B. felt slight pain in the course of the fang, but to which she paid little attention.

From time to time, however, after the first attack, Madame B. had a recurrence of pain in this part, lasting for some days—the pain being deep-seated, lancinating, and accompanied with some degree of sensibility in the corresponding part of the gum when pressed with the finger, and also in the upper part of the lip, near the ala of the nose, along the course of the diseased root. These pains only lasted for a few days, returning at intervals of two months, with the same characters.

About fifteen days ago the pain suddenly returned, and became permanent: it was a continual dull pain, with a sensation of distension of the part, accompanied by extreme sensibility of the skin on the corresponding half of the face and all that portion which was not covered with hair, but there was no distinct localisation of the neuralgic pains. The patient declared that the slightest touch with the finger on any part of the face was quite unbearable. The pain increased during the first week, leaving, however, from time to time, intervals of ease which lasted for some hours. During the last eight days, it acquired an intensity which totally deprived the patient of rest.

Present State.—The cheek is neither red nor swollen; it is only very sensitive to the slightest touch. The gum opposite the diseased root is of a dark red, and somewhat swollen; there is no abscess or fistulous orifice; it completely covers the fang, except at one small projecting point. Percussion upon this part shows that the root is not loose, and does not produce any pain: the dental canal is very much enlarged at its external opening; it soon terminates, and will not allow a probe to reach to the apex of the root.

I diagnosed a cyst at the apex of the root, and proceeded to extract the fang.

Two vertical incisions were made in the gum, one in front and the other behind, so as to expose the root, which was extracted by means of the key, after three unsuccessful attempts.

Examination of the Root (fig. 8, a).—The total length of the root is about seven-tenths of an inch: the lower half is hard, resisting, and formed by the fang itself; the upper half consists of a soft oval swelling, adherent to the apex of the root, and offering a certain amount of motion. It is a kind of oblong tumour, somewhat enlarged at its highest point, and of a rounded form. It is invested by a fibrous-looking envelope, which is of a whitish colour where it is united to the fang, and red and injected at the opposite extremity.

An opening made in the length of the sac penetrated a cavity, in the midst of which was the apex of the root; it was filled with a thick, red, and apparently sanguineous fluid.

Microscopic Examination.—(M. Ch. Robin, June 19, 1859.)—(Fig. 8, b.)—When some of the liquid was placed upon a glass and examined by the microscope, it was seen to contain a large number of crystals of cholesterine, forming more than half the entire mass. The remainder consisted of fat-globules, also very numerous, some granular and hypertrophied leucocysts, and a large number of blood-globules.

The parietes were composed of a fibrous network, consisting of laminæ of fibres interlaced in every direction, arranged rather in layers than in bundles, in the midst of a large quantity of finely-granular amorphous matter. There were also nervous fibres like those which are met with in the normal periosteum, and numerous capillary vessels. Throughout the preparation was a considerable quantity of fat-granules, measuring from 0mm.001 to 0mm.005 in diameter, and in certain parts globules of oil, some solitary, and others assembled in small groups. Here and there were small masses of grains of hæmatosin, and some embryo-plastic nuclei.

A CLINICAL REPORT ON EPITHELIAL CANCER.

(From the 'Medical Times and Gazette.')

HOSPITAL FOR DISEASES OF THE SKIN.

EPITHELIAL CANCER OF THE EAR—CURE BY ESCHAROTICS.

(Under the care of Mr Startin.)

John B., a labourer, aged 70, a very healthy-looking and florid man, and looking much younger than he was, was admitted July 4, 1853. Two years before a warty growth had commenced on the left ear. He picked it; and then it became sore, and for a year was subject to darting pain, often sufficient to keep him awake at night. He had not lost flesh or health. He had never, in his work, been exposed to soot. It was an elevated softish lump, situated in the curve in the upper part of the ear, a quarter of an inch in length, and half-an-inch in breadth. It was scabbed over, but the scab separated very easily, leaving an eaten-looking surface, with white shreddy portions adherent to it. It was treated by the very free application of caustic. On July 18 it was almost cicatrised.

THE LONDON HOSPITAL.

EPITHELIAL CANCER OF THE TONSIL AND PHARYNX.

(Under the care of Mr Adams.)

Elizabeth B., aged 50, a married woman, mother of several children, of good general health. Eleven years before she had a severe sore-throat, which lasted for several weeks. One year ago, having suffered from dyspepsia for several years, she observed an enlargement on the left side of the pharynx, attended with pricking sensations. The pain was worse at night, and became lancinating. There was no family history of cancer, and she had never smoked. She was admitted on January 11, 1853. She was then sallow, cachectic-looking, and emaciated. Extending over the left half of the soft palate, and to its right margin, was a large ulcer, with small hardened granulations, and an everted margin. It was sloughy-looking in some parts, and was much swollen. She was deaf on this side, probably from obliteration of the orifice of the Eustachian tube. The only passage into the pharynx was on the right side. She was obliged to be fed on spoon diet.

GUY'S HOSPITAL.

EPITHELIAL CANCER OF THE CHEEK, INDUCED BY THE IRRITATION OF A BROKEN TOOTH—EXCISION.

(Under the care of the late Mr Bransby Cooper.)

A farm-labourer, aged 49, admitted in 1852 for cancer of the inside of the cheek. He was a man of very sober habits, and had never smoked. For several years he had a sharp tooth in the lower jaw, which had been liable to prick and irritate the cheek. It often made it bleed. There was no family history of any malignant disease. One year before he first noticed a little spot in the middle of the inside of the left cheek. He did not seek medical advice until the month preceding his admission, when the offending tooth was removed. A firm growth sprung up soon afterwards in the socket. The operation was performed on October 31. Three days after the operation, erysipelas came on, and the wound gave way. It, however, healed again; but at the time of the last note there was a rather irritable scab, on a purplish, swollen, and angry-looking surface, and he had a darting pain in it.

ST GEORGE'S AND ST THOMAS'S HOSPITALS.

EXCISION OF CANCER OF THE LIP—RETURN OF THE DISEASE IN THE GLANDS.

(Under the care of Mr Johnson and Mr Macmurdo.)

William B., aged 73, had the greater part of his lower lip excised by Mr Johnson, in St George's Hospital, in 1853. The disease, which was an extensive epithelial cancer, had existed for eighteen months. There was no history of cancer in his family. At the time of the operation, there was a slight degree of swelling of some of his submaxillary lymphatics. The lip healed well after the operation.

On January 14, 1855, I met with this man in St Thomas's Hospital, under Mr Macmurdo's care, on account of enlarged glands under his jaw. He stated that after the operation he had remained well for about six months, when the glands began slowly to enlarge. During the last five months the increase had been rapid, and he had greatly lost flesh. He was now very ill and cachectic, and there were very large glandular lumps under both sides of his jaw, which were firmly fixed to the bone.

(To be continued.)

ANCHYLOSIS OF THE INFERIOR MAXILLA CURED BY THE METHOD OF PROFESSOR RIZZOLI.

(From 'L'Sperimentale et Racoglitore Medico de Fano.')

THE patient, who was named Louise Vaiola, and was about twenty-three years of age, appeared to be of a lymphatic-venous temperament, and had menstruated regularly for nearly eight years. A short time after the appearance of this function, she perceived that the left commissure of the lips was visibly drawn away from the same side, without, however, any cause being discoverable for the change. About the same time a slight but continuous pain made itself evident at the left posterior angle of the lower jaw, and went on increasing, assuming the lancinating character, and accompanied by tumefaction about the bone; the surrounding soft parts became red, swollen, and painful; and, in a word, all the symptoms of the formation of an abscess showed themselves. Without consulting any surgeon, the patient herself applied local fomentations, which probably hastened the formation of the pus, and which eventuated in the bursting of the abscess internally near the last molar tooth but one; immediately the pain, redness, and swelling disappeared as if by enchantment, and the only symptom which remained was a certain stiffness of the jaw, the movements of which became gradually more difficult, painful, and finally altogether impossible, and for eight years she remained in this miserable state.

On the 4th of December, 1858, the patient was admitted into an hospital. At this time the left cheek was more depressed than that of the opposite side, and an exploration being made along the horizontal ramus of the jaw, the fact was established of a loss of osseous substance near the posterior angle of the jaw. The finger when introduced inside the cheek was also stopped by strong adhesions of cicatricial tissue, and the teeth were to be found in their alveoli, all except the two upper incisors, the absence of which allowed of the introduction of some liquid nutriment.

It is not our intention to enter into the question of the cause of the disease, as that would lead us too far from our subject. It remains for us to describe the actual operation, as performed by the Author on the 12th of December.

The patient being seated, and her head supported against the breast of one assistant, while another drew down the lower jaw, the operator made an incision in the *cul-de-sac* which united the lip and gum of that side, exactly at the space which corresponds to the second and third molars: this incision divided not only the mucous membrane, but also the subjacent soft parts, so as to lay bare the lower border of the jaw; by this wound was then introduced the straight and blunt branch of the bone forceps, which embraced the internal border of the jaw, so that the cutting edge of the instrument was easily placed on the outside. A slight force only was necessary to completely divide the maxilla at one stroke, and thus restore to the jaw the motion which it had lost for eight years. The operation was not interrupted by any complication, either during or after its performance.

The following is a short report of the consequences of the operation:

December 14th.—The girl is quiet; a slight hæmorrhage which broke out in the wound was quickly stopped by the insertion of a piece of lint steeped in Pagliari water. In the evening, fever and headache.

15th.—Wound painful; pulse nearly normal. In the evening, pulse febrile.

16th and 17th.—Improvement.

18th, 19th, and 20th.—Pain less severe. Tepid fomentations to the seat of the disease. To have a scammony purgative.

21st.—Pain more intense; deglutition difficult.

22nd.—Slight improvement; the separation of the jaws accomplished with some ease, and without much pain.

25th, 26th, and 27th.—Steady improvement; a piece of cork was introduced into the angle of the jaw, in order to keep the two parts separate.

28th.—A small abscess appeared at the left side of the chin, which was opened on the 8th of January. This was caused by the presence of some small fragments of bone which were necrosed and detached. The formation of the false joint, however, which was to render permanent the movements of the jaw, was somewhat delayed, and it was not till after the extraction of the two teeth next the fracture that the false joint was completely established, while during the greater part of the time hospital gangrene was present in the neighbouring wards.

The girl who was the subject of this proceeding is now quite cured: she is able to separate her jaws widely; to chew her food—to eat, drink, laugh, speak, as in the normal state, and will soon return to her family, among whom she is at present an object of wonder and delight.—'Presse Médicale Belge,' and 'Dublin Medical Press.'

CASE OF OVARIAN TUMOUR CONTAINING HAIR, TEETH, ETC. BY S. J. A. SALTER.—The patient was a married woman, aged 49, the mother of several children. She came to Guy's Hospital in consequence of having had, for some weeks, pains and uneasy sensations in pelvis. Upon an examination being made *per vaginam*, a tumour was felt on the right side of the uterus, about the size of an orange. Nothing was done; but after the patient had been in the hospital about a week or ten days, she was suddenly seized in the night with symptoms of acute peritonitis, and in a few hours she expired. The post-mortem examination showed that the right ovary had been converted into a cystic tumour, which had burst, and some of its contents escaping, had been the cause of the fatal peritonitis. Upon opening the cyst, a quantity of serous fluid escaped; it appeared to be composed of serum and fatty matter, and within were found large white masses of fat and bundles of hair. Upon removing the loose contents of the tumour, the interior was seen to be lined with a soft, pink, serous-like membrane; on the anterior surface, the crown of three teeth projected free, and beneath them could be felt a mass of bone; close to this was a projection of a brown colour, about the size of a broad bean, from the surface of which sprouted some fair pale-brown hair. Of the three teeth, the two largest were implanted in the subjacent bone by means of true fangs; the smaller one was simply adherent to the lining membrane, and had no fang—a condition not unfrequently seen in congenital teeth—teeth, that is, which are already in the mouth at birth. The teeth resembled a *dens sapientiæ* and two premolars, one of the latter being destitute of a fang. The two larger teeth contained pulps; in the smaller, the pulp cavity was completely obliterated, the dentinal tubes radiating from a central point, not a cavity. Under the microscope, sections, both vertical and transverse, of all three tissues—enamel, dentine, and crusta petrosa—presented every normal appearance; and it would be utterly impossible, from structural examination, to discover any difference between these and ordinary human teeth. But the most interesting result of this investigation was the discovery of nerves in the tooth-pulp; nerves having as yet, I believe, never been recognised in any of these ovarian tumours. Let me now enumerate the different structures that have been found from time to time, by different anatomists, in these ovarian developments. Mr Gray has found a *nervous centre:* I have found *distributed nerves.* Besides these, *blood-vessels, bone, periosteum, dentine, crusta petrosa, enamel, tooth-pulp, unstriped muscle, striped muscle, (?) areolar tissue, adipose tissue, epithelium, sweat-ducts, sebaceous follicles, fœtal hair,* have all been recognised in these growths. Mr Salter shows that these ovarian formations are not dependent upon sexual intercourse. Undoubted instances are well known of their occurrence in the virgin. Such cases are not numerous, but they do occur; and one of the most striking, and one entirely reliable, came under the cognizance of Rokitansky, in a little girl *six years of age.* The parts are now in the Imperial Pathological Museum at Vienna. The question as to what calls forth these ovarian developments, appears to the writer to receive its answer, rather than explanation, in analogy—in the analogy which these formations have to the non-sexual reproduction which is known to prevail in many of the lower animals.—'Guy's Hospital Reports,' vol. vi., Third Series.

CASE OF SEPARATION OF THE ENTIRE ALVEOLAR PROCESS OF THE UPPER JAW. BY DR C. GUENTHER. (Varges' 'Zeitschrift,' band xiv., s. 174.)—A workman, while employed in the construction of a stone bridge, was struck in the face by the angle of a large mass of stone. He remained senseless, owing to the hæmorrhage, for a quarter of an hour, and three hours later was seen by the Author. After clearing out the coagula from the mouth, which almost obstructed respiration, the injury was found chiefly to consist in the complete separation of the alveolar process of the upper jaw—the entire arch, in an unbroken state, lying in the lower jaw, only suspended by some shreds of the gum and soft palate. A wound two inches long opened a passage through the upper lip into the nostril. The displacement was reduced with unexpected ease, and the molars being in good condition, pressure was kept up against them by means of the lower jaw. The incisors were carious, and those of the lower jaw had been driven out by the accident; so that a capacious opening existed, admitting of the removal of the accumulated blood from the mouth, and of the administration of semi-fluid food. Owing to the destitute condition of the patient, it was difficult to obtain material for effectually securing the motionless state of the jaw by means of bandages. However, so rapidly did the healing process take place, that in seventeen days the man was enabled to commence trying to chew, and on the twentieth day was again at his work, repaying the Author's care by neither fee nor thanks.—'British and Foreign Medical Review' for October.

ON THE TEETH IN THE VARIETIES OF MAN.

OUR design in the present paper is to present our readers with such facts as our observation and research have supplied in reference to the natural or acquired conditions of the teeth in the different varieties of mankind. We do not claim for our contribution the dignity of a systematic treatise, neither do we offer it as an original investigation. Much we ourselves have noticed has been already recorded by anatomists, and commented on by ethnologists. Still, we believe that by bringing together the stray facts that are to be found scattered through their writings, and by verifying them as far as our limited field for observation will admit, we shall be drawing attention to a little-cultivated department of professional knowledge, and at the same time be contributing something to the anatomical argument for the specific unity of the human race. We are quite ready to allow that, in reference to the latter subject, we must not demand of anatomy alone a decision. Man, of all the creation, is the being whose origin and relations can never be satisfactorily elucidated by mere physical science. History, philology, and above all psychology, must be heard ere we can hope to arrive at a just conclusion. But, of all the arguments founded on a similarity of structure, that derived from dentition is perhaps the strongest. In a recent article in this Journal, we have referred to the persisting characteristics of the teeth under diversities of outward circumstance; to the inherent property the dental organs possess of resisting those influences which in the course of generations are capable of modifying the osseous, the muscular, and the tegumentary systems; and to the insight into the physiology and affinities of the animal which a study of dental structure and configuration unerringly affords. Whatever opinion may be held as to the origin of mankind; whether, with Prichard and British ethnologists in general, we hold the doctrine of universal descent from a single pair of protoplasts; or whether we incline to the hypothesis of Professor Agassiz and some Transatlantic writers, which demands a multiplication of centres of origination,—we maintain that whilst psychical nature, and the cerebral development subservient to it, isolate Man entirely from the inferior creation, his dentition not only warrants, but requires the reference of every known variety of the human race to one and the same species. The characteristics of the human permanent teeth have been lately discussed at some length in this Journal: we cannot, however, omit mention of them here, as by so doing we should neglect the definition of the premises on which we found our argument.

They may be summed up as follows:—

1st. The numerical formula (common to Man and the Catarhine Quadrumana).

$$i, \frac{2-2}{2-2} \quad c, \frac{1-1}{1-1} \quad p, \frac{2-2}{2-2} \quad m, \frac{3-3}{3-3} \quad = \quad 32.$$

2nd. The equable development of the teeth.

3rd. The absence of all sexual distinction in particular teeth.

4th. The moderate size of the incisors, canines, and premolars; the configuration of the grinding surfaces of the latter, together with their implantation by one fang in the lower jaw, and by two fangs, which are in most cases connate, in the upper.

5th. The large size of the true molars in comparison with the incisors, canines, and premolars, and the character of their grinding surfaces.

6th. The absence of break or *diastema* in the series.

7th. The curve formed by the molar series, including the premolars, and the parabolic arch which the entire dental series describes.

These distinguishing peculiarities of the human dentition are demonstrable in every nation and tribe; and we may add, that were a race of beings in other respects resembling Man to be discovered in whom the dental organs differed widely from the standard we have indicated, their right of affiliation to the human stock might be considered scientifically disproved.

But it is a matter of everyday experience, that the teeth of individuals differ in many minor points. In some the incisors are larger than in others: in this case the canines may be found to be more acuminated, in that more obtuse, and the relative size of the true molar teeth will be found to differ in individuals. In persons moving in the same class of society, the greatest difference is observed in the tendency to caries; and the teeth of some wear down by attrition comparatively early in life, whilst others retain them to a late period little injured. Again, it is frequently found that these characteristics are repeated in the different members of the same family; that peculiarities in size, strength, and proclivity to disease of the teeth are as much transmitted and inherited as feature and complexion, or gout and insanity. Now, what is true of individuals and families will be found to obtain on a larger scale when we comprehend nations and varieties in our survey. The differences which are observed as individual peculiarities in one tribe become in another the more general characteristics, and this will be found most frequently the case when such tribe has been long isolated and barbarous. But, be it understood that these national differences do not involve departure from the typical standard of human dentition; and we shall show, as we proceed, that no peculiarity has been found in the teeth of any human variety which may not occasionally arise in individuals of other stocks, and therefore that no such peculiarity can be admitted as a ground of specific differentiation.

For the sake of convenience, in the present article the varieties of mankind will be taken rather according to their geographical distribution than according to their anatomical characters or the affinities of language. We may commence with the nations of Africa, as in the present day affording us tribes sunk in the lowest depths of barbarism, whilst within the historic period the valley and delta of its great northern river have formed the nursery and repository of the art, the science, and the literature of the world.

The Quaiquœ race, including the various tribes of Hottentots, together with the Bushmen or Saabs, has long been known as occupying a very low, if not the lowest position in the scale of humanity. The physical deterioration and mental degradation of the Bushman is only found equalled amongst the Kelœnonesian tribes of Australia and the savages of Tierra del Fuego. What, then, is the condition of the dental organs in this, one of the lowest phases of humanity?—does it in any way approach the dentition of the higher Quadrumana, or does it differ from the standard observed in higher races? To this question we can answer decidedly. We have examined the teeth in both Hottentot and Bosjesman skulls, and have compared them with the teeth of individuals of other nations, and have been unable to detect any difference of a specific character. Professor Owen has observed that in the melanous varieties generally the true molars are of large size, and that the fangs of the wisdom and penultimate molars are not as a rule connate or conjoined. This he finds generally to obtain, although it is most remarkable and constant in the Australian variety. The truth of this observation is not for a moment to be disputed, albeit we meet with exceptions which prove it not to be a ground of specific distinction, and as such it is not advanced by Professor Owen himself. But in these, the lowest races of Africa, we do not find the molar series attaining a remarkable size. In the skull of one female Bosjesman we have examined, the true molars present (the dentes sapientiæ, upper jaw, were not in place) were of moderate size; neither they nor the premolars differed from the usual standard. The canines did not exceed in length the premolars or the lateral incisors; they were not more acuminated than in the European. In the lower jaw, the third molars were, as usual, smaller than the penultimate; and in the latter there was no indication of the fifth or posterior tubercle, in this respect agreeing with the typical configuration. In the skull we are referring to, the central incisors, upper jaw, were absent; but the examination of another specimen has enabled us to say that these teeth in the Bushman are not remarkable in size or position. In fact, both Bushmen and Hottentots appear to exhibit the prognathic character in a less degree than do the true Negro tribes, and, consequently, the incisor teeth have a less slanting implantation. Cuvier was led by the examination of a female of this race to a different conclusion. In commenting on the head, he remarks: " the jaws are more projecting than in the Negro." A comparison of several Bosjesman and Hottentot skulls with those of other African races will afford evidence that Cuvier's case must have been exceptional. In the head of the male Bushman figured by Blumenbach, as is remarked by Prichard, there is no projection of the jaws; on the contrary, the incisor alveoli and teeth, together with the chin, are on the same perpendicular line. It it usual in the melanous races to find the third molar, in both jaws, relatively larger than in Europeans; and, as we have already noticed, the fangs are most commonly distinct. We shall have to refer frequently to this special point of structure as we proceed. In the skull of a Hottentot we found that the molars present, and especially the wisdom teeth in the upper jaw, were as small, and even smaller, than in many European crania. The grinding surfaces of the third upper molars accorded with the typical condition in the blending of the two internal tubercles; and although the extremities of the fangs were distinct, the two external roots were conjoined for a considerable distance. In like manner, the two external fangs of the upper penultimate molar were partially confluent, but to a less extent. We are thus led to the conclusion that the dentition of this, one of the lowest developments of Man, presents no special aberration from the typical dentition of the human stock.

In the Caffre we have noticed that the incisors, although projecting in accordance with the prognathic character of the maxillæ, have not been of larger than the average size in well-developed Europeans; neither have the canines been longer or more pointed. In one specimen the upper molars were of moderate size, the antero-posterior measurement of the upper true molar series being one inch one and a-half lines. We have found a greater antero-posterior measurement not unfrequently attained by the upper true molars in the European. The dens sapientiæ, upper jaw, has usually the three fangs distinct. In one cranium we observed an indication of the fifth or posterior tubercle in the second molar of the lower jaw. This, which is not the typical configuration in Man, is nevertheless occasionally to be met with, and it does not appear to be limited to any particular race. We have seen it well marked in modern European skulls, in Negroes, in a cranium of a Greenlander, in a Chinese, and also in an ancient Egyptian and in a Romano-Briton. It is sometimes to be found in the penultimate lower molar of one side only. It has been asserted that the teeth in the Caffre tribes are rarely, if ever, affected by caries. We have, however, seen a specimen in which the lower molars were much decayed.

An examination of the teeth in a considerable number of African Negro crania has enabled us to draw the following conclusions:—In the African Negro the teeth are usually of large, but not excessive, size; they are regular, commonly sound, although caries is occasionally observed, and they seldom present that extreme amount of wearing down of the cutting and grinding surfaces which may be found so commonly in the Australian and Polynesian. The incisors are large, broad, and thick, but not of greater absolute dimensions than in numerous individuals amongst the white varieties. The teeth do not depart from the human type in their relative proportions; for wherever the incisors and canines are of considerable size, the true molars are likewise large, and maintain that superiority which is a distinguishing feature of the teeth of Man. The lateral incisors are well formed, and in the perfect entierty of their outer angles they adhere more invariably to the human type than do the same teeth in some more civilized races. The canines are not proportionally longer or more pointed than in the white man. The premolars agree in configuration and relative size with the typical standard. The true molars are usually of large size, generally larger than in the European; the dentes sapientiæ, although smaller than the other molars, are in the majority of instances of greater relative and actual dimensions, and the fangs of the last-named teeth are usually distinct in both jaws. But in the character of their grinding surfaces and their general contour, the molars of the African Negro present no departure from the typical configuration, and, as in other races, there are many instances in which a general description will not entirely apply. For instance, we have found the true molar teeth varying considerably in size in individual crania. In several cases we have observed the molars of no larger size than in many European skulls. We have ascertained by measurement that the antero-posterior dimensions of the true molar series in the upper jaw, in eighteen Negro skulls, varied from one inch one and a-half lines to one inch four lines, the former measurement being less than is frequently attained by the same series in the civilized races. A similar result has been elicited by the admeasurement of the true molar series in the lower jaw. To show how the dimensions of the grinding teeth vary even in individuals of the same stock, we may state that we have before us, at the time of writing, three lower jaws of Anglo-Saxons, for the possession of which we are indebted to an eminent archæologist, the late Secretary to the Society of Antiquaries. In one of these the fore and aft measurement of the true molar series is one inch one and a-half lines, in another one inch three and a-half lines, in the third one inch four lines. We have seen the last-named measurement exceeded in only one African jaw; in it the lower true molar teeth measured, from before backwards, one inch five lines. Again, with regard to the size of the dentes sapientiæ, in many Negroes they may be found no larger than in some Europeans, and both varieties present considerable individual differences. The Anglo-Saxon jaws just referred to furnish an instance of this: in one of these the third molar is considerably smaller than the penultimate; in another it is nearly of the same size; in the third it is absolutely larger, longer, and broader than the second. In both African and European jaws the fifth or posterior tubercle in the third lower molar may be found occasionally but slightly indicated or obsolete. Then the implantation of the ultimate and penultimate grinders presents individual differences in Negroes. We have seen the three fangs of the upper third molar tooth in a Negro skull blended into one, and the two outer fangs of the second molar connate; whilst, on the contrary, the distinction of the fangs of these teeth, although not the general rule in the Germanic and Celtic races, is not of very unfrequent occurrence. In an early British cranium, we have noticed the fangs of the posterior molars as separate and distinct, as is common in the Negro and Kelœnonesian. Lastly, we would observe that, according to our limited experience, the general characteristics of the African Negro dentition are best exemplified (albeit liable to exception) in the Negroes of the Western Coast. The teeth in the crania we have seen from Eastern Central Africa, and from the Mozambique, appeared to us to present less markedly the minor differences above noted.

The prognathic development of the jaws also, and the consequent obliquity of implantation of the incisor teeth, though common in a varying degree to all African nations, not excluding the Egyptians, attains its greatest development in crania from the Western Coast. That a projection of the muzzle is not entirely confined to the black varieties of mankind, may be learned by the examination of any large collection of the skulls of different races. In most nations a degree of elongation of the maxillæ is to be noticed in individual instances, and we have seen crania, both of modern and ancient inhabitants of Europe, as decidedly prognathic as some of the better-formed skulls amongst the melanous races.

Before leaving the dentition of the African Negroes, it may not be out of place to notice some of the practices by which they render the teeth subservient to the realization of their conception of personal beauty. The deformities which barbarous races produce in the attempt to arrive at an ideal perfection are matters of some curiosity. As such endeavours are coextensive with humanity, their origin must be sought in a common psychical nature. Civilization has hitherto checked, but has never eradicated, the natural tendency. Constriction of the waist and transfixion of the ear-cartilages are not practices entirely unknown in the politer portions of Christendom; the English of the present day are only beginning to tolerate their beards, in the last century they shaved their heads and wore horse-hair.

According to Livingstone, the Bashinje, a tribe inhabiting Western Central Africa, file their teeth to a sharp point. A similar practice obtains amongst the Makúa or Makúana, a tribe near the coast of Mozambique. We have seen a skull from Eastern Central Africa in which this operation had been performed; and the Quaquas, inhabiting the Ivory Coast, are said to have the same usage. Knocking out one or both of the upper incisors at the age of puberty seems to be the vogue amongst many tribes. The Batoka, inhabiting the central country through which the Zambesi flows, knock out the two upper incisors of both sexes. Dr Livingstone tells us that a person who has the teeth is considered ugly, and that no young woman thinks herself accomplished until she has got rid of them. The reason they assign for the practice is, "that their object is to be like oxen, and those who retain their teeth they consider to resemble zebras." Again, the Shilúkh, a tribe of warlike Negroes inhabiting the plain of Sennaar, extract a single upper incisor. We have seen crania, one of which was certified from the Western Coast of Africa, in which this disfigurement had been effected. It is curious that the same custom appears to have prevailed amongst some of the savages of Australia. One of the most remarkable arts of the toilet is practised by the ladies of the Fúlah or Felatah race, a tribe of Western Guinea. By means of the acid of the gorra-nut, and the juice of some other shrub, together with indigo, they dye the incisor teeth of different colours, one blue, one yellow, another purple, whilst the fourth is allowed to retain its pristine whiteness. Some tribes hold certain superstitions with regard to the succession of the teeth. Amongst the Bakaa, we are informed by Livingstone, a child who cut the upper front teeth before the under is said to "tlola," or transgress, and is put to death. He adds that he believes the same practice obtains amongst the Bakwains.

In the Abyssinian races, including the Abyssinians, the Modern Egyptians or Copts, and the Barâbra, the teeth, which are said to be white and regular, do not project to the same extent as in the Negro races. Belzoni, however, describes the teeth of the Ababdeh, a Nubian tribe, as being fine—white, protuberant, and very large. Attention was drawn by Blumenbach to what he conceived to be a peculiarity in the teeth of Egyptian mummies. He describes the incisors as thick and round, not, as usual, flattened into edges, but resembling truncated cones; and the cuspidati are not pointed, but broad and flat on the masticating surface, like the neighbouring bicuspides. He was inclined to think that these peculiarities were not acquired, but depended on a natural variety. Mr Lawrence, who investigated the subject, came, however, to a different conclusion; and his opinion was confirmed by Dr Prichard and Mr Estlin, who examined the teeth in two mummies containing the remains of children whose death had occurred between the completion and loosening of the first set of teeth. In one of the mummies all the first set were cut, and the rudiments of the second were to be seen under the gums. "Each jaw contained, with the exception of one tooth which had dropped out, the usual number of incisors, cuspidati, and molars; and all of these had precisely the form of the teeth of European children of the same age." There can be no doubt that the condition in question is due to the process of natural attrition; and it is, perhaps, partly to be accounted for by the large proportion which vegetables, roots, cereals, and fruits contributed to the diet of the ancient Egyptians. It is certainly not peculiar to them as a race, for it is a most common condition in the teeth of the Oceanic tribes, both amongst the Amphinesian and Kelœnonesian varieties. It has been noticed amongst the Esquimaux, and we have seen the same condition in the skull of a Laplander, in a Gentoo, and frequently in crania belonging to the early inhabitants of Great Britain. It may be that peculiarities of diet will not account in all cases for this extreme wearing down of the teeth, but that further research may show a deficiency in the earthy constituents of the dentine and enamel. Be this as it may, we have before us the upper and lower jaws of an Anglo-Saxon in which the incisors and canines are worn down to exactly the condition Blumenbach has described. The incisors are reduced to mere cylindrical stumps, the upper surfaces displaying a central oval mass of dentine surrounded by a layer of enamel, and the canines are worn down to resemble the bicuspids. Our examination of skulls from Egyptian mummies has convinced us, moreover, that this peculiar state of the teeth is not always to be found. Of three crania, in one only did we find the teeth worn away to the same extent as those in the skull of an ancient inhabitant of Britain which we selected for comparison. In the other two, the effects of attrition were moderate. In two of these crania, the third upper molars were found to be nearly as large as the penultimate ones, and to exceed the usual dimensions of the same tooth in Europeans, in this respect agreeing with the general African conformation. In the third specimen, although the molar teeth were large, the dens sapientiæ in its relative smallness accorded rather with the European character. We found caries affecting a molar in one Egyptian skull, proving that the Professors of the Dental Art in Egypt mentioned by Herodotus might not have been entirely useless members of society.

The remarks we have made apply equally to the condition of the teeth, which have been found similarly worn away in the Guanche mummies of the Canary Isles. In one specimen of this race, we have seen the grinders worn down to the roots. In another, we found the anterior surface of the inferior incisors worn off obliquely. The central superior incisors were absent, but the lateral and canines appeared comparatively unworn. The molars were worn relatively according to their order of succession, and the first superior molar principally on the inner part of its grinding surface. Nothing is known of the manners and habits of the ancient Guanches, but we may well suppose that the cookery of an imperfect civilization necessitated the imposition of severe tests on the consistency and strength of the dental tissues.

F. C. W.

(To be continued.)

METROPOLITAN SCHOOL OF DENTAL SCIENCE.

INTRODUCTORY ADDRESS,

DELIVERED ON WEDNESDAY, OCTOBER 10TH, 1860, AT THE OPENING OF THE SECOND SESSION,

By ROBERT T. HULME M.R.C.S., F.L.S.

GENTLEMEN,

We have met to-day for the purpose of opening the Second Session of the Metropolitan School of Dental Science. There are not wanting those who have questioned the utility and the wisdom of these annual addresses. Thus much may, at least, be said in their favour, that as no other mode of opening the Medical Session has been adopted, it is fair to presume that no better has hitherto been devised.

I believe, however, that the custom has other advantages besides those which are merely negative. There is probably no other occasion throughout the session upon which we are all assembled together, the students on the one hand, the lecturers on the other. There is no other opportunity when we can speak to you, as it were, with one voice ; that we bid those welcome whose faces are familiar to us ; or that we can say to those whom we may now see for the first time, that it will be our earnest endeavour so to teach them, so to work with them, that when they leave us to enter upon the active duties of their Profession, they may possess a thorough knowledge of those principles which should guide them in practice. It is the only time when your studies can be spoken of collectively, that the bearing which they have upon each other can be placed before you, and the necessity of attending to them all can be impressed upon your minds. When this address shall have been delivered, and each lecturer shall have entered upon the subject-matter of his special course of lectures, the harmony and connection which exist between the different subjects are too apt to be lost sight of in the multiplicity of details which you will have to learn. We have most of us a greater inclination for certain studies than for others ; and it not unfrequently happens that even the industrious student, following in this respect the bent of his own mind, cultivates his favourite study at the expense of others which he has less inclination to. It is, however, a great mistake, and one which the very ambition to excel in certain subjects tends to encourage. It should be the endeavour of the student thoroughly to ground himself in all those sciences which are essential to the practice of his Profession: then, when he has done this, and not before, let him turn his attention to his favourite pursuit, and he will be all the more certain to excel in it for the knowledge which he has obtained of other collateral sciences. So long as you are students, you should carefully bear in mind the real object of your studentship; not that you should be only good anatomists, or good workmen, or good chemists, or good surgeons, but what all these are essential to form—and that is, good Dentists.

Before entering more fully upon the subjects to which I have just alluded, it will not be misplaced if I say a few words with respect to the School itself. Gentlemen, our School is still young, so that we cannot dwell upon the past, but must look rather to the future: nevertheless, it has passed safely and prosperously through that critical period, the first year of its existence. Let it only thrive as much during the next two or three years as it has done during the last, and it will be destined to enjoy a long and vigorous manhood. It has not had the good fortune to be established in the midst of unanimity and peace in the Dental Profession; but it has had to make its way against opposition and against conflicting opinions. It has been condemned by some; it has been looked upon doubtfully and lukewarmly by others; but, at the same time, it has met with true and earnest supporters. In spite of these disadvantages and discouragements, it numbered seven-and-twenty students during the first session. It was not to be expected that an equal number would enter the School in the second session; but there are already several additional students, and there is every prospect of others joining when the business of the session shall have commenced.

Since we last met together, an event has taken place which must not be passed over in silence. I refer to the establishment of the London School of Dental Surgery. In the Inaugural Address which was delivered at the opening of the School, there are certain passages which have reference to our own, and which do not fairly represent the feelings and opinions of those who belong to it. It is stated that it is the wish of those who represent the College of Dentists to detach the Dental Profession from the general Profession of Medicine. This is a somewhat ambiguous phrase, and may be interpreted in two very different ways. If it is meant that they desire the Dentist should be ignorant of medicine and of surgery, then it is incorrect; but if it is intended thereby that they desire to see the Dental Profession, as it has ever been, a separate and distinct branch of practice, and that they conceive that its members form a sufficiently numerous and important class of practitioners to have a governing body of their own, selected from amongst themselves, then it is perfectly correct. It is also stated, that "a School has been formed in which the curriculum appears to be more restricted than it should be." In this respect, I, for my own part, am willing to admit that there is some truth in the statement; and I so far agree with this latter charge, as to acknowledge that the curriculum is not that which it ought eventually to be. But herein lies a most essential distinction between the College of Dentists and its opponents—a difference in which none are so much interested as yourselves. In spite of the misrepresentations of party zeal, it may at least be assumed that the supporters of the College of Dentists possess the same amount of integrity, and have been actuated by the same laudable purpose as they are willing to suppose has governed the conduct of their opponents; viz., that of raising the status of the Dental Profession. The supporters of the College of Dentists have endeavoured to do this in such a manner that those who had already entered the Profession, and had probably been engaged in the study of it for some time, might be included in and able to avail themselves of this reformatory movement; while, on the contrary, the opponents of the College appear to have set down for themselves an ideal standard of excellence, without any regard to the interests or opportunities of those who might have already entered the Profession under the old state of things, when no examination or any definite qualification was even expected of those who practised as Dentists. The one party has been desirous of elevating the Profession, but, at the same time, of retaining those who had previously joined it; the other party appears utterly to have ignored the past, and to have been desirous of creating an entirely new body of practitioners. I am speaking now, Gentlemen, of the time when the examination at the College of Surgeons shall have ceased to be a matter of form, when its Dental Certificate is no longer to be obtained by asking for, and the curriculum which has been put forth shall be carried into effect. No one can have kept more aloof from the political discussions which have disturbed the Profession than I have done; and I have certainly no wish to plunge into the mire and discomfort of them now. I desire only to regard the present subject as a student's question, and to speak of it so far as it affects your interests, and that of every Dental pupil throughout the kingdom.

I will not enter into all the details of this elaborate curriculum; but I will merely direct your attention to one point — and that is, to the length of time during which the student in Dentistry and the student in Surgery are to be engaged in the acquirement of professional knowledge. Four years is the period assigned to both; but how differently are they placed as to the manner in which they can occupy themselves during this time! It is usual for the Medical student to pass six or nine months of these four years in dispensing, while during the remainder of the time he is engaged in attendance upon lectures and hospital practice; so that at the end of the four years he is able to present himself for examination. But how does it stand with the Dental student? In addition to the four years to be passed in the general acquirement of professional knowledge, there is an additional clause which imposes upon him a distinct term of three years, during which he is to be engaged in the work-room of the Dentist. I need not tell you that while he is doing this, he cannot be attending to lectures and hospital practice in the manner which is required by the curriculum of the College of Surgeons. It will, therefore, occupy more time, and will consequently cost more money, to obtain the Dental Certificate of the College of Surgeons than to become a full member of that body. Lastly, when the student shall have passed through the necessary studies—when he shall have successfully gone through the ordeal of his examination in the various subjects which form the curriculum,—that is to say, in the General Anatomy of the body, in the Special Anatomy of the head and neck, in Dental Anatomy and Physiology, in Materia Medica, in General Surgery, in Dental Surgery, in Dental Mechanics, and, lastly, in Chemistry and in Metallurgy,—what, I would ask, is to be the reward of all his labour, and in what relation will he stand to the chartered body which has undertaken to direct his studies and to pronounce upon his qualifications? He will receive a certificate, stating that, in the opinion of the three Surgeons and the three Dentists who form the Examining Board, he is fit to practise his Profession; but beyond making this bare assertion, the College of Surgeons have nothing whatever to do with him. The Certificated Dentist, once that he has quitted the College of Surgeons, has no more right to re-enter within its walls than if he had received a similar testimonial from the College of Preceptors, or from the College of Dentists itself. During his studentship, he will probably have gazed with wonder and admiration at the rich stores of anatomy and physiology contained in that museum which has been founded on the genius and industry of a Hunter, organised and arranged by the kindred spirit of an Owen, and is now advancing to still greater perfection through the important though unobtrusive labours of a Quekett. He may have passed through the spacious library, thinking of the time when he should be privileged to avail himself of its valuable contents—when he might there commune with the master-spirits of old, or pursue the latest discoveries of science in the writings of his contemporaries. If he has indulged in any such vain delusions, the period has arrived when he must cast them off. The possession of the Dental Certificate has abruptly severed the tie that bound him to the College of Surgeons. The educational establishment disowns the offspring it has reared, and he is sent forth into the world like an illegitimate child whose parent is ashamed of him and disowns him. I can hardly suppose that such a barren result, after so much time and study had been expended in the preliminary education, could have been contemplated even by those who were willing that the Dental Profession should be swallowed up in the College of Surgeons. In commencing with a limited curriculum, the College of Dentists has only followed in the footsteps of similar educational establishments. It is precisely what has been done by the College of Surgeons itself. Let any one compare the present curriculum of that body with what it was thirty years ago, and say whether this is not the case.

I am afraid that the discussions and dissensions which have agitated the Profession have created too much antagonism and too much angry feeling to leave any hope that these wounds can be healed at present. There is, however, one point upon which I venture to think an error has been committed by some members of the College of Dentists ; and that is, in supposing that the possession of the Certificate of the College of Surgeons must necessarily prevent those who hold it from acting with the College of Dentists. I would say, let those who wish possess the Dental Certificate, just in the same manner as they might have the full membership of the College of Surgeons or any other medical qualification. I would forget these minor differences for the sake of union. After all, there is much that both parties possess in common; there is an earnest, and, I am convinced, a most unselfish wish, on the part of the majority, to elevate the Profession, and to rid it of the quacks and impostors who have so long disgraced it. There are many who have taken the Certificate of the College of Surgeons, who still desire to see a separate and independent body which shall represent the Dental Profession. Are there not some, I would ask, who might reconcile these unfortunate differences, which, while they benefit none, throw discredit upon all ?

There is one more passage I will refer to, and with which I am sure we shall all most heartily agree. Mr Cartwright says, "It must be acknowledged that the Dental Institutions of America have sent forth a great number of gentlemen who form a body of Dentists of a high and uniform standard ; and, scattered over the world, they exhibit a degree of excellence, individually, which is conclusive of the value of their practical and systematic education." To this I will only add, that it is upon the very principles upon which these institutions have been established in America, that their counterpart in this country—the College of Dentists—has been founded. If you will contrast the curriculum of the American Colleges with that which has been laid down by the College of Dentists, you will find that it is essentially the same. If you inquire into the relation in which these Colleges stand with respect to the Medical Profession in the New World, you will find that they are entirely distinct, and that the Medical and Surgical Institutions of that country have never felt it incumbent on them to interfere with the education or organisation of the Dental Profession. Let those, then, who have hitherto laboured for a similar object in this country, continue their efforts; let them take heart against all discouragements, not doubting but that they will yet see the accomplishment of their wishes, and that the seed which they have sown will in due time bear fruit.

Thus much, Gentlemen, by way of justification of the course which has been pursued by those who founded our School. Let us now pass to the consideration of those studies which will occupy you during the Session. First, however, there is a question to be considered, which, if it has not arisen in your own minds, may possibly be suggested to you by others. Is it, after all, really necessary that you should go through this course of study at all? Will it not be sufficient if you obtain what is called a practical knowledge of your Profession?—that is, in other words, blindly follow the practice of those who have gone before you, without troubling yourselves to inquire into the principles upon which it is founded. Of all nations, it is the Englishman who has been proudest of being what is termed a practical man; at the same time holding in contempt all that is spoken of under the name of science, as though science was something which was opposed to practice; yet, after all, what is Science, but practice which has been argued and reasoned upon, and thereby reduced to a system? It has been this exclusive devotion to the Practical, or, as it is often termed, common-sense view of the matter, which has retarded the progress of our arts, of our sciences, and of our manufactures, and, until lately, has left England so far behind in the competitive struggle of the nations of the world. Let us hear what Archbishop Whately has said upon this practical or common sense. "By common sense," he says, "is meant, I apprehend (when the term is used with any distinct meaning), an exercise of judgment, unaided by any art or system of rules; such an exercise as we must necessarily employ in numberless cases of daily occurrence, in which, having no established principles to guide us—no line of procedure, as it were, distinctly chalked out,—we must needs act on the best extemporaneous conjectures we can form. He who is eminently successful in doing this, is said to possess a superior degree of common sense. But that common sense is only our *second-best* guide. That the rules of art, if judiciously framed, are always desirable when they can be had, is an assertion for which I may appeal to the testimony of mankind in general; which is so much the more valuable, inasmuch as it may be accounted the testimony of *adversaries:* for the generality have a strong predilection in favour of common sense, except in those points in which they respectively possess the knowledge of a system of rules; but in these points they deride any one who trusts to unaided common sense. A sailor, *e. g.*, will perhaps despise the pretensions of medical men, and prefer treating a disease by common sense; but he would ridicule the proposal of navigating a ship by common sense, without regard to the maxims of nautical art. A physician, again, will, perhaps, contemn systems of political economy, of logic, or of metaphysics, and insist on the superior wisdom of trusting to common sense on such matters; but he would never approve of trusting to common sense in the treatment of diseases. Neither, again, would the architect recommend a reliance on common sense alone in building, nor the musician in music, to the neglect of those systems of rules which, in their respective arts, have been deduced from scientific reasoning, aided by experience: and the induction might be extended to every department of practice. Since, therefore, each gives the preference to unassisted common sense only in those cases where he himself has nothing else to trust to, and invariably resorts to the rules of art wherever he posseses the knowledge of them, it is plain that mankind bear their testimony, though unconsciously, and often unwillingly, to the preference of systematic knowledge to conjectural judgments." * But, whilst I am thus urging upon you the practical utility which belongs to your studies, I would not have you altogether overlook the purely intellectual grounds upon which such scientific knowledge may be advocated, as providing you with sources of enjoyment which the uncultivated mind can never possess. "The question, *Cui bono*—to what practical end and advantage do your researches tend?" says Sir J. Herschel, "is one which the speculative philosopher who loves knowledge for its own sake, and enjoys, as a rational being should enjoy, the mere contemplation of harmonious and mutually-dependent truths, can seldom hear without a sense of humiliation. He feels that there is a lofty and disinterested pleasure in his speculations which ought to exempt them from such questionings: communicating, as they do, to his own mind the purest happiness (after the exercise of the benevolent and moral feelings) of which human nature is susceptible, and tending to the injury of no one, he might surely allege this as a sufficient and direct reply to those who, having themselves little capacity and less relish for intellectual pursuits, are constantly repeating upon him this inquiry. But if he can bring himself to descend from this fair but high ground, and justify himself, his pursuits, and his pleasures in the eyes of those around him, he has only to point to the history of all science, where speculations, apparently unprofitable, have, in innumerable instances, been those from which great practical applications have emanated. What, for instance, could be more so than the dry speculations of the ancient geometers on the properties of the conic sections, or than the dreams of Kepler (as they would naturally appear to his contemporaries) about the numerical harmonies of the universe? Yet these are the steps by which we have risen to a knowledge of the elliptic motions of the planets and the law of gravitation, with all its splendid theoretical consequences and its inestimable practical results."* Our own Profession is not without examples of useful and unexpected applications arising from apparently remote and unconnected discoveries. When a combination of sulphur and caoutchouc was first formed in the manufacture of elastic bands, who could have supposed that we had here an indication of that valuable material for the application of artificial teeth, which we are all familiar with under the name of vulcanite? Still more remote appeared the discovery that paper immersed in nitric acid unites with that body and becomes highly combustible. Years afterwards the same fact is put forward in another shape, and we are told that cotton when treated in a similar manner becomes converted into a material more explosive and dangerous than gunpowder. The next step consisted in finding that this same explosive material was soluble in ether. In this shape it is known under the name of collodion; the surgeon has already made use of this substance as a dressing for wounds, and it has recently been announced as the rival of vulcanite for Dental purposes. The contraction of the frog's leg first led Galvani to the discovery of the electric current: years had to elapse before this new power grew to its full magnitude and importance; but in the present day we make use of it to convey our messages and to connect the ends of the world together; or, under another form, we use it to explode the mine and rend the bowels of the earth asunder; or, under that same form, we convey it into the cavity of the tooth, and destroy the aching and sensitive pulp.

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* 'Elements of Logic,' Preface, p. 15.

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* 'Natural Philosophy,' by Sir J. Herschel, p. 10.

Of the various subjects which will require your attention, the first and most important is Anatomy. If this science does not constitute the foundation of all which you will have to learn, it is at least the basis upon which you will have to depend in the application of that learning to practice. He who would undertake to repair the derangements of a complicated and delicate piece of machinery, must first make himself acquainted with the normal or natural arrangement of its parts: if this is necessary with a piece of human mechanism, where every portion is visible to the naked eye, and every part can be freely examined, how much more must it be so in the case of the living body, with its wondrous assemblage of bones and ligaments, muscles and tendons, nerves and brain! These portions of the body serve to bring us in relation with the external world, and into communion with our fellow-men. The central portion of the skeleton, the vertebral column with its expanded thoracic and pelvic cavities, serves to contain and support the viscera. The long levers which form the upper and lower limbs, held together by their strong but flexible ligaments, constitute the passive organs of locomotion. Around these are grouped the multitude of muscles which move the bones and form the active organs of locomotion. Above all is the expanded series of vertebræ, commonly termed the skull. It is in this osseous cavity, which in man is so much more capacious than in any other animal, that the nervous system becomes developed into the brain. This important organ regulates the actions of the rest of the body. It may be regarded as the seat of government, from whence all acts of volition proceed. These are communicated to every part of the body by certain of the nerves which are in connection with the brain, while another series of these passive and involuntary messengers convey to it every sensation, and it thus becomes the centre of all our pleasurable and painful feelings. But how little is to be learnt of the actual structure of these organs by means of the unaided senses! It was not until the natural philosopher and the optician had prepared for the use of the anatomist that triumph of human knowledge and ingenuity, the modern microscope, that he could pass beyond the coarser parts of animal structure, and solve the mystery of their ultimate arrangement. When the various tissues are examined by means of this instrument, all our previous ideas concerning them are changed. Muscular fibre is found to be no fibre, in the ordinary acceptation of the term. Each ultimate fibrilla, measuring on an average the ten-thousandth of an inch in diameter, is seen to be made up of a number of cells arranged in linear series. Each cell contains a dark mass in its centre, of a highly-refracting substance; this forms the cavity of the cell; while around each central mass is a clear space, consisting of the cell-wall. Nerve-fibre in like manner presents externally a delicate transparent membrane in the form of a tube, *tubular membrane;* within this is a hollow cylinder of a material known as the *white substance of Schwann,* containing in its centre a transparent substance termed the *axis cylinder*, and which appears to be the essential element of the nerve. Bone, again, when submitted to a similar investigation becomes bereft of its apparent solidity, and is seen to be permeated by a multitude of microscopic cavities, with a much larger number of canaliculi or tubular processes radiating from them: these convey the elements of nutrition to those portions of the bone which are not reached by the capillary blood-vessels.

In this way we obtain a very precise idea of the structure and arrangement of every organ of the body; but, after all, we have only learnt what is the condition of these organs in a state of rest; as yet we know nothing of the manner in which these structures contribute to the performance of the functions which they are destined to fulfil. Minute and interesting as are the results afforded by the previous mode of investigation, it gives us no information with respect to the changes which take place when the machinery is in action. At this stage of the inquiry pure anatomy begins to fail us, and in order to proceed further we must leave the consideration of mere form and arrangement, and endeavour to ascertain what are the conditions which govern the actions of the organs—or, in other words, we must ascertain what are the laws which regulate the functions of the living body, and to Anatomy must be added a knowledge of Physiology.

It requires but little advance in the latter science to teach us that there is an essential difference in the manner in which these muscles and nerves perform their functions. Thus, some muscles are under the control of the will, and are hence termed *voluntary muscles.* There are others, on the contrary, which are not only not under the control of the will, but which act in spite of it: this is the case with the muscles of the heart, of the stomach and intestines, and, in fact, with all those which are engaged in carrying on what are more especially spoken of as the vital functions; these are, therefore, termed *involuntary muscles.* Of the nerves, some convey *sensation*, others bestow the power of *motion ;* and there are a third series which preside over the functions of the involuntary muscles, and serve at the same time to harmonise and connect the different parts of the body together: these are termed the *sympathetic* nerves. It belongs, however, to physiology to ascertain not only the manner in which the different organs act, but also the way in which these acts are accomplished, and to take congnisance of the changes which they induce in the organs themselves. To solve these questions, it is necessary to enter upon an entirely new series of investigations. We must ascertain what is the composition of these muscles, nerves, and bones; what are the elementary bodies which enter into their formation, and what are the proportions in which they are combined. The physiologist must call to his assistance the science of Chemistry. Physiology has ever advanced in proportion to the progress which has been made in Chemistry. Experience teaches us the necessity of respiration, and of a due supply of air; but it took nearly four thousand years for mankind to learn what was the actual nature of this important function. Up to the middle of the sixteenth century, the passage of the air into the lungs was supposed to be for the purpose of cooling the blood. It was only after the successive labours of Van Helmont, of Robert Boyle, of Mayow, of Priestley, and many others, upon the nature of the atmosphere and of the different gases, and when their researches had been crowned by the discovery of oxygen and the composition of the atmosphere by the great French chemist Lavoisier, that the true nature of respiration was ascertained.

There can scarcely be a more striking instance of the intimate alliance which exists between Anatomy, Physiology, and Chemistry, than the successive steps by which this knowledge was acquired. The heart, the veins, and the arteries were known to exist in the body in the most ancient times of ancient Greece; but, finding the arteries always empty after death, the anatomists of those days supposed that during life they were filled with air—a doctrine which is still recorded in the name which these vessels have received. It was not until six hundred years afterwards, when Galen proved by direct experiment that, like the veins, the arteries also contain blood, that their true purpose was explained. The blood was, however, still supposed to pass direct from one side of the heart to the other; and it was only after the lapse of thirteen centuries, and when the dissections of Vesalius had shown that this could not take place, that Columbus of Padua and Cesalpinus of Pisa showed that the blood which was conveyed to the right side of the heart passed into the lungs, and from thence it returned to the left side of the heart, the air from the lungs being supposed to accompany it. Cesalpinus also ascertained that when a ligature was placed on a vein, it became distended on the side of the ligature which was farthest from the heart. About the same time, Fabricius, of Aquapendenta, carefully examined and described the valves of the veins; but he only regarded them as serving to support the column of blood which these vessels contain. It remained for his illustrious pupil Harvey to give a definite meaning to these scattered and unproductive notices of his predecessors. By a series of careful and logical inductions, founded upon numerous dissections and experiments, this great man gave the true explanation of the way in which the blood is circulated through the body. In 1616 Harvey publicly demonstrated his discovery: but now anatomy and physiology had performed their part, another century passes away, and in 1777 Lavoisier announces to the world the composition of the atmosphere. In his experiments on respiration, he found that the air which issued from the lungs was different to that which had entered: it would not support combustion; it could not sustain life; it had gained carbon, it had lost oxygen. Here, then, was the explanation which had been so long sought for; and at the end of more than two thousand years, by a combination of Anatomical, Physiological, and Chemical investigations, the problem was solved.

Life is a perpetual vortex, in which there is a constant interchange between the fluids and solids of the body. Every movement, whether voluntary or involuntary, every sensation which is conveyed by the nerves—nay, every act of thought involves the destruction of certain particles of the body. Hence the organs which have been previously mentioned would only suffice for the momentary existence of the individual. In order that he may continue to live, means must be provided for repairing the loss which ensues from the action of the different organs. This leads us to recognise the necessity of those parts of the body which are provided for its nutrition, and for supplying fresh particles which should take the place of those which have been destroyed. In the lower animals, where there is little differentiation between the tissues of their body, this process is exceedingly simple. The food is received into a central cavity, where it becomes digested, and from whence it is directly diffused throughout the body. As we ascend in the scale of organisation, the process becomes more and more complicated, until it attains its climax in the Mammalia.

In these higher animals and in Man there is a preliminary stage, during which the food is specially prepared before it is allowed to pass into the stomach, where the actual process of digestion takes place. This first stage is accomplished in the mouth, and is that in which we are more especially interested. In order that the food may be properly acted on by the gastric juice, it must first be thoroughly masticated, and mixed with the saliva. If this is imperfectly performed, additional work is thrown upon the stomach, and thus lays the foundation of impaired digestion. If the chyle is imperfectly formed, we know of no supplementary process by which the first error can be corrected. Abnormal chyle must necessarily lead to a deficient or vitiated state of the blood, and this to imperfect nutrition of the organs. It is, therefore, most essential that the teeth should be preserved and maintained in a healthy condition. From this circumstance arises the importance of Dental practice—first, in endeavouring to preserve the teeth ; and when this can no longer be accomplished, in providing artificial substitutes to take the place of the natural organs which have been lost. The organisation of the teeth, though different in its kind, is little less complicated, and certainly not less admirably contrived, than that of every other part of the body. Only a few years ago, these organs were regarded as dead, inert bodies, which were incapable of undergoing any change, excepting such as was of a purely chemical nature. The treatment of the diseases of the teeth was necessarily on a par with this imperfect knowledge of their anatomy and physiology. Here, as elsewhere, the microscope has come to our assistance, and revealed the true nature of their internal structure.

Hunter hesitated to regard the teeth as organised, because he was unable to find blood-vessels in the dentine. Yet, after all, the immediate presence of the capillary blood-vessels in an organ only implies great activity of the parts. Thus, in the muscles they penetrate in every direction between the component fibrillæ ; but examine the ligaments and tendons, which are passive rather than active organs, and in these the blood-vessels are but sparingly distributed, while in the case of cartilage, which is entirely passive, they are absent ; before reaching this structure they curve back upon themselves, and end in a series of loops. In the case of the teeth, the blood-vessels are seen to terminate in a similar manner on the surface of the central pulp, where it is in immediate proximity to the dentine. The dentine, although it is not permeated by blood-vessels, contains a system of delicate tubes ramifying through it, and by means of which the transuded plasma of the blood is conveyed to every part of the tooth, except, perhaps, the enamel. In addition to this vascular pulp and tubular dentine, there is a layer of periosteum around the fangs of the teeth, which has a plentiful supply of blood-vessels ; and the teeth, therefore, stand in nearly the same relation to the nutrient fluid of the body as the other structures to which I have just alluded. Yet those organs are liable to inflammation, and to undergo various morbid changes ; it will, therefore, be readily conceived that the teeth are subject to analogous changes to those which occur in other parts of the body. That the teeth are constantly undergoing change, may be shown by comparing two teeth together which have been cut in halves, the one from the young subject, the other from the old. In the first, the dentine is of a pure white, and perfectly opaque; in the second it is much darker, frequently marked with patches of a brown colour, and in many parts semi-transparent, while the pulp cavity is greatly diminished by the gradual increase of the dentine.

The treatment of the diseases of these organs, therefore, requires a knowledge of the principles of general surgery. What these principles are, you will learn in the course of lectures which will be delivered on that subject. I may perhaps be permitted to observe, however, that the advances which have been made of late years in the sciences I have already referred to have exercised a marked and beneficial influence on the medical treatment of disease. Formerly it was a constant struggling and fighting with Nature; whereas in the present day it is rather a humouring of Nature—a removing of obstacles, thereby enabling her to accomplish that cure which, after all, must in reality depend upon herself. The change which has taken place in the practice of Medicine might be compared to that which has occurred in Navigation. The old and hardy mariners of England battled bravely and gallantly with the storm, only too often to be vanquished in the unequal contest. The sailor of the present day, if he has paid due attention to the teachings of science, knows that there are laws which govern the tempest as well as the calm; the actual law being that the hurricane moves in circles. Instead, therefore, of contending with the tempest, he places his vessel in safety by steering her out of its course, and not by driving her through it.

The peculiar structure of the teeth imparts a special character to many of their diseases, which, in consequence, require a particular mode of treatment. The irregularities of the teeth, arising in various ways, and depending upon a variety of causes, also demand a method of treatment peculiar to themselves; in this manner there has arisen a special branch of practice, which, while it requires a knowledge of general surgery, yet possesses distinctive characters of its own, and constitutes the subject of the Lectures on Dental Surgery.

In spite, however, of every method of treatment, the teeth are peculiarly liable to be prematurely lost. When this is the case, the Dentist must avail himself of the mechanical appliances of his art: of these he may be justly proud; for although fully aware how far it must ever fall short of the perfection of Nature, yet it is the only instance in which a mechanical substitute does really perform the office of the natural organ. The excellence to which Mechanical Dentistry has been brought in the present day, precludes a man from succeeding in practice, unless he is able to do something more than take an impression of the mouth. There will be little hope of his prospering, unless he not only knows the way in which the work should be done, but can also do it for himself. It is true that this part of practice can only be learnt in the work-room, and by labouring at the work-bench. There are, however, often various ways of doing the same thing; and there are, also, many points connected with the application of artificial teeth which cannot be learnt in the work-room, and in these matters the information to be obtained from an experienced and practical teacher is of great value. I feel, however, that in the present day it is unnecessary for me to urge farther upon you the importance of the Course of Lectures on Mechanical Dentistry.

I have already referred to the subject of Chemistry, when speaking of Physiology; but this is a science of universal application, and there are few of the natural sciences, and scarcely any of the arts, to which it does not afford important assistance. It has, moreover, special claims upon the attention of the Dentist. Not only is he constantly employing the various metals in the operations of the work-room, but he also makes use of them in the pure state as remedial agents. The extraordinary malleability and ductility of gold, which allows of a single grain being drawn out into five hundred feet of wire, or being beaten into leaves not more than one two hundred and eighty thousandth of an inch in thickness, together with its adhesive, and I might almost say welding properties, and its indestructible nature, render it the most appropriate material which has hitherto been obtained for the purpose of stopping teeth; yet the presence of the two-thousandth part of antimony, lead, or bismuth, would so far destroy these properties as to render the gold unfit for the use of the Dentist. Tin is another metal which is occasionally employed in place of the more costly material; and others of the metals are used for the same purpose in the form of amalgams. For these reasons, Metallurgy forms a special feature in the Course of Lectures on Chemistry. It can hardly require any argument on my part to convince you that it is most desirable you should be acquainted with the nature and properties of bodies which you are constantly making use of, and which are liable to be altered by such slight admixtures as those I have referred to.

The remaining subject, that of Comparative Anatomy, forms an important adjunct to the sciences of Anatomy and Physiology. We no longer regard man as an isolated being, whose organisation can be properly studied apart from that of the rest of the animal kingdom. Every animal may be regarded as an experiment which has been prepared for the use of the physiologist by the hand of Nature herself. In these lower animals he meets with the several organs reduced to their simplest condition; he learns to distinguish between the essential parts of an organ, and those parts which have been added to fulfil the special requirements of the individual. It was in the lower animals that the tubular structure of the teeth was first discovered; and if the anatomist had followed up the hint which Nature thus gave him, we should long since have learned the structure of these organs in man, and should have been spared much useless argument as to their actual nature. In itself, Comparative Anatomy constitutes one of the most delightful studies you can pursue, bringing you, as it does, to an intimate knowledge of the living works of the Creator, and revealing to you the successive phases through which the animal kingdom has passed from the first dawn of creation until the present day.

In addition to attending the Courses of Lectures, I would particularly urge upon you the advantage of being present at the Examinations which are held in each of the classes at stated intervals throughout the Session. I have purposely made use of the term "being present," because I am satisfied that even by this you will gain much good. It will of course be still more advantageous to you, if you will endeavour to answer the questions which are put by the Lecturer. It is by far the readiest mode in which you can ascertain what you really know, and what you are deficient in; it is like a man taking stock, and learning what goods he has got in hand and what commodities he is in want of. If you will only attempt to answer the questions, you will acquire a habit of expressing yourselves with a precision and accuracy which can be obtained in no other way: it teaches you to arrange your thoughts in a methodical manner, and to avail yourself to the utmost of whatever knowledge you may possess. "Reading," says Bacon, "makes a full man, writing a correct man, and conference a ready man."

Lastly, Gentlemen, a few words upon the subject of prizes. These public recognitions of his merits form, not unreasonably, the great object of the student's ambition; and those who succeed in obtaining them have a just right to be proud of the success which has attended their exertions. Still I would say, be not over-anxious about them. Men are naturally endowed with different degrees of ability, and that which we term genius must of necessity stand first in public estimation; but he who labours diligently upon a worthy object is as much to be commended as he who, with greater abilities, gains public honours. Only a few can possess these marks of distinction; but by steady perseverance and a due attention to your studies, you may all fit yourselves for the honourable and successful practice of your Profession, and, above all, you can obtain the approval of your own conscience—that *mens conscia recti*, which bestows firmness and dignity on the character, gives patience in adversity, and produces moderation in prosperity.

COLLEGE OF DENTISTS OF ENGLAND.

CONVERSAZIONE.—OCTOBER 30.

On Tuesday evening, October 30th, the Members of the College of Dentists opened their Fifth Annual Session with a Conversazione, at their rooms in Cavendish square. The meeting was one of the fullest and best attended we have witnessed for some time, many members of the Medical Profession, and of other gentlemen whose names are well known in connection with the arts and sciences, being present. Amongst the company we noticed the President of the Pharmaceutical Society; Professor Redwood; the Rev. T. Wiltshire, President of the Geologists' Association; Rev. W. Roberts; Drs Waters, Semple, Corfe, Leared, Richardson, Webb, Cobbold, and Waite; Sir Charles Aldis; Messrs Weeden Cooke, T. Morson junior, Spencer Wells, Bird, Collard, Bowen May, Humphrey, T. Cook, Beaucroft, Knapp, Prothero, Burden, Skaife, Baker, Griffiths, Robinson; Wood, Brighton; Imrie, Winterbottom, Rymer, Hockley, Stevens, Paris; Miles; H. Perkins, R. Hulme, Sutcliffe, Bradford; Brooks, Banbury; Little, Bristol; W. Perkins; Kempton; Weiss, &c.

Since the last Session, the rooms have been entirely re-decorated, and rendered more commodious by the addition of a new lecture-room for the use of the School. The principal alteration in the arrangements from the former meetings consisted in the objects exhibited being collected in a spacious gallery adjoining the rooms in which the members have hitherto been in the habit of assembling. The walls of this gallery were covered with diagrams, most of them illustrative of human and comparative anatomy. At one end of the room were displayed some curious but powerfully-executed diagrams of the skeletons of various animals, exhibited by Dr Cobbold. The centre was occupied with a colossal human skeleton, contrasting with those of the Chimpanzee and Gorilla, which were placed on either side of it. The skeletons of the Tiger, Ox, Giraffe, and Bat, illustrated some of the modifications which the skeleton undergoes in order to adapt it to the peculiar habits of the individual. A large skeleton of the Swan and a small one of a Fish represented the changes required to convert the osseous framework of the land animal into one which should fit its possessor either for an aërial or aquatic mode of existence. Along one entire side of the room were eight frames, each containing an anatomical drawing of the human figure, the size of life, the production of an Italian anatomist of the last century—Mascagni, Professor of Anatomy to the University of Siena. These rare and valuable drawings, kindly lent for the occasion by Mr Harnett of Museum street, attracted considerable attention. Facing the diagrams illustrative of comparative anatomy, were a beautifully-executed series of drawings of human anatomy, exhibited by Dr Richardson. These drawings were arranged so as to form distinct series, representing the Nervous, Vascular, and Respiratory systems, and the organ of voice. On the table in front of these were a number of Mr Tuson's admirably-executed models of the structure of the human body: many of these were remarkable for the close resemblance which they bore to the actual appearance of the parts in the dead subject; the flaccid and half-putrid condition of the muscles as they appear in the dissecting-room being reproduced with a closeness to nature which we have not seen equalled even by wax models. These were followed by diagrams representing the human teeth, with their microscopic appearances. The series of anatomical drawings terminated with a series showing the various modifications of the stomach in the carnivorous, herbivorous, rodent, insectivorous, and others of the higher animals: the latter were also exhibited by Dr Richardson. The remaining portion of the side wall was covered with drawings of the Echini. On a table in front of the drawings was a case containing some geological specimens; for these the College was indebted to the Rev. Mr Wiltshire, Mr Crecy, and other members of the Geological Association.

On another table, Mr Lloyd Bullock exhibited specimens of solution of peroxide of hydrogen, the physical properties of this body being shown by Mr Vacher. The solution of peroxide of hydrogen is, in fact, water richly charged with active oxygen. The experiment of evolving the oxygen from the solution was very interesting. The peroxide is now becoming of great interest, owing to the fact that Dr Richardson has introduced it into medicine. We may remark, in passing, that it forms, with tincture of myrrh, a most effective wash for the mouth in cases of fœtid gums and teeth. The solution is colourless, and has a taste slightly styptic, like alum.

At the end of the room was a large table covered with specimens of mineral teeth, instruments, and the various appliances used in Dentistry, exhibited by Messrs Ash, Lemale, Smale, Taylor, Harnett, Pratt, Mentzer, Bishop, and Hallam.

Mr Hallam's shilling instruments are remarkable specimens of cheapness and utility. Those who care more for the useful than the ornamental qualities of their instruments will do well to inspect the stopping and plugging instruments of this maker. Some of these instruments were made from a curious dark granular matter, which by fusion is at once converted into steel, without any other intermediate process. It is known as Taranaki steel, from the name of the place where it was first discovered. Specimens of this worked up in bars and rods of steel, ready to be manufactured into instruments, were placed on the table.

At the opposite part of the room was a large display of microscopes, contributed by Messrs Smith and Beck, Mr Ladd of

Beak street, and Mr Pillischer of Bond street. It is unnecessary that we should refer to the beauty and accuracy of the instruments of these well-known makers. We cannot, however, help calling attention to a series of injections of the teeth and other structures, by Messrs Smith and Beck. The peculiarity of these specimens consists in their being transparent; so that, instead of the objects being viewed by reflected light, as is the case with the ordinary injections, they are mounted as transparent objects, and can be submitted to the highest power of the microscope.

The meeting was opened by an excellent address, delivered by the President, George Waite, Esq., who was listened to with considerable attention, and was several times interrupted by the hearty applause of his audience. The address is given below *in extenso.*

At the close of the evening, we found a number of the visitors and members listening to a very interesting account of the Pistolgraph, by Mr Skaife, the inventor of the instrument. By this ingenious contrivance, photographs are taken upon glass on a miniature scale, which adapts them for brooches, bracelets, or even for rings and shirt-pins. After the impression is obtained, another plate of glass is placed over the picture, and by means of cement and heat the two are perfectly joined together, and form a compact mass, from which the photograph can never be obliterated. The company did not separate until a late hour, and appeared to be much gratified with the proceedings of the evening.

THE PRESIDENT'S ADDRESS.

Gentlemen,—I am happy to avail myself of the privilege usually accorded to your President of offering a few remarks upon the position and prospects of your College at the opening of the Annual Session. Anxious as I have been to discharge in an efficient manner the responsible office to which you have done me the honour to elect me, I feel that I should have been wholly unable to fulfil its duties, but for the able and zealous co-operation of your Council. I can assure you that the duties of that body have been most onerous during the past year, which has been fraught with events of the utmost importance to the welfare and stability of your College. Neither can I allow the present occasion to pass by without offering my personal thanks to your Honorary Secretaries for the kind assistance they have afforded me; nor can you, gentlemen, be fully aware of how much we are all indebted to them for the time and labour which they have so unceasingly bestowed upon the affairs of the College.

At the formation of this College, the presence amongst us of many eminent men seemed to portend a brilliant and successful career. It is unnecessary at the present time that I should allude to the various causes which unhappily led to disunion, and induced so many to desert the cause they had previously advocated. However much we may deplore the desertion of those who were once its supporters, it says much for the vitality of the College, that in spite of the efforts which have been directed against it, it has borne up against all opposition, and that at the commencement of this its Fifth Session, it stands in a better position and is surrounded with more hopeful prospects than it has been at any other period subsequent to its first establishment.

When I accepted the office of President, I was fully aware that I was placing myself in no easy or enviable position. If I had consulted merely my own personal comfort and convenience, I should most certainly have declined the honour you had conferred upon me, however much I might have been flattered by such a mark of your confidence and respect. But, earnestly desirous of serving my Profession, and satisfied of the soundness of the principles advocated by the College of Dentists, I felt that it was incumbent upon me to sacrifice my personal feelings; and I determined at all cost to do whatever lay in my power to advance so good a cause. I knew that by so doing I should range myself in opposition to members of our Profession whom I regarded with respect, although I differed from them in their views with regard to the policy of the Profession. I ventured, however, to suppose that although such difference might exist, yet that each party would be guided in their conduct by that courtesy which distinguishes a civilised and cultivated society from a state of barbarism and vulgarity. I regret, therefore, to find that those who are opposed to us, apparently unable to depend upon the goodness of their cause, instead of putting forth their arguments in calm and temperate language, allow the journal which represents them to indulge in the grossest personalities, and to use language which gentlemanly society invariably repudiates. Such conduct is ever condemned, even in the less responsible columns of a public newspaper, and much more so when, by being put forth in the pages of a professional periodical, whose conductors and writers are tolerably well known, it becomes a matter of personal insult, reflecting disgrace, not on those against whom it is levelled, but on the parties from whom it originated. An apology remains still due from the nominal heads of the Profession, for a word made use of, some months since, in the journal which represents their opinions. I hope to find that such a word was used without their sanction.

During the past year the College of Surgeons has commenced its issue of Dental Certificates, and something like a hundred gentlemen have availed themselves of this mode of allying themselves to that honoured body. It is not surprising that this should have been the case, when the terms of admittance are so easy. But this by no means decides the point at issue between ourselves and those who are opposed to us. Let it be distinctly understood that the possession of the Dental Certificate of the College of Surgeons by no means implies that its possessor does not desire to see the

College of Dentists continue in existence. So far is this from being the case, that there are several gentlemen who hold the Dental Certificate, but who still continue to co-operate with those desiring to see a separate and independent organisation of the Dental Profession. Only within these few days a letter has been received from one of these gentlemen, expressing his good wishes for the success of the College of Dentists, and his willingness to do all in his power to promote its welfare.

During the same period the College of Dentists has strictly adhered to the line of conduct it has hitherto pursued, and has endeavoured to the utmost of its power to improve and elevate the status of the Profession. Since the opening of the last Session, several courses of lectures have been delivered to the Members of the College. These consisted, first, of a sound and practical course, by Mr Erichsen, the talented Professor of Surgery at the London University, on the Diseases of the Maxillary Bones. The second was on the Anatomy and Development of the Teeth, by Mr Hulme, a Member of our Council. In this course, the recent discoveries of M. Guillot in France, on the development of the teeth in man and animals, showing the erroneous nature of the doctrines which were previously held, were first publicly taught within the walls of this College. The third and last series consisted of a course on Anæsthetics, by Dr Richardson. Nowhere in this country has so extended and complete a course of lectures been delivered on this all-important and interesting subject. These lectures contained a large number of new and interesting physiological experiments, and were marked with that originality of thought and perspicuity of reasoning which has already obtained for our esteemed friend and lecturer not only a European, but a world-wide reputation.

The Metropolitan School of Dental Science, which was opened at the commencement of the last Session, has been worthily and successfully engaged in educating those who are hereafter to fill the ranks of our Profession. At the Distribution of Prizes, in April last, we had ample proof of the change which this system of education had already brought about, even in that short space of time, in the knowledge and status of the Dental student. I cannot refrain from reminding these gentlemen that it is really their interests, not our own, that we are advancing. It is from their ranks that the Members of this College must be ultimately recruited. Every office in their own College is open to them, while it is impossible that, *as Dentists*, they will ever be allowed to take a part in the government of the College of Surgeons. I sincerely trust that whatever medical qualifications they may hereafter obtain, they will never consent to sacrifice the independence of their Profession. The Apothecary has his representative and governing body; the Physician and Surgeon have each their College; even the Veterinary Surgeons possess the same; and the

Pharmaceutists are organised, and possess their charter. Is, then, the Dental Profession so far below all these, that it alone is to be deprived of its representative and governing body? Are its members so utterly spiritless, that they will consent to abandon their indefeasible rights?

In the month of September last, the term for which the College held their present premises expired. The question was then debated whether a separate house should be taken for the purposes of the College; but the difficulty of finding such accommodation as was required in a suitable locality, decided the Council in obtaining a further lease of the rooms in which the meetings have hitherto been held. They have also obtained additional accommodation for the purposes of the Conversazioni; and I trust that although our meetings may be more numerously attended than they were during the last Session, our members and friends may be less inconvenienced than on those occasions.

I am happy to have to acknowledge several liberal donations to the Library and Museum; and during the Session it is intended that the Library shall be open on certain evenings for the use of Members, Associates, and the Pupils of the School. Under the superintendence of our worthy and talented Curator, Dr Purland, the Museum is being entirely rearranged. The additions which have been made at various times to the specimens illustrative of Dental Anatomy and Pathology have rendered a more methodical classification of them than had hitherto been adopted necessary. This will occupy some time in its completion; but, when fully carried out, the specimens will form a complete history of the human teeth, both in their healthy and diseased condition.

In consequence of a requisition from several Members of the College, desiring that the Monthly Meetings which were formerly held for the reading and discussion of papers on subjects relating to the Dental Profession should be resumed, the Council have arranged that the rooms shall be placed at the disposal of those members who are desirous of carrying out this proposition. Feeling, however, that the duties they have already to attend to are more than sufficient to occupy their attention, the Council declined to take upon themselves the responsibility of these meetings. A Special Committee of Members has, therefore, been nominated. The gentlemen forming this Committee have drawn up such rules as they consider expedient for the regulation of these meetings; and they will be submitted to you on the first meeting, to be held on Tuesday next. As, however, there may be some gentlemen here this evening who may not be able to attend on that occasion, I may mention that papers which may be forwarded by members who reside at a distance, and are therefore unable personally to attend, will be read by the Honorary Secretary to the Committee. Lastly, gentlemen, I have the gratification to announce to you that two of the Vice-Presidents of the College have offered a prize of thirty guineas for the best essay on 'Caries of the Teeth.' Mr Robinson, with that public spirit which he has always evinced where the interests of his Profession are concerned, has offered the sum of twenty guineas as a premium for the best essay on the above subject; and Mr Tibbs, not less zealous in the same cause, has greatly enhanced the value of Mr Robinson's offer by adding an additional prize of ten guineas for the second-best essay.

I am sure you will all applaud the good sense and intentions with which Mr Robinson and Mr Tibbs have selected this subject; it is one replete with interest to us all, opening a vast field for new theories, and intimately connected with disordered conditions of the system generally. I may be allowed to state that caries of teeth is most prevalent where society is most advanced, and luxurious habits prevail; whilst in those countries where diet is natural, and habits primitive and simple, as amongst the peasants in the North of Europe, the teeth are not only hereditarily sound, but also of an astonishing size and strength. We shall look forward to this competition with much interest, and long cherish the names of the successful candidates as benefactors to society and ornaments to this College. The conditions of the prize essays are now published, and may be obtained from the Secretary of the College.

In France, during the past year, an attempt has been made to organise the Dental Profession of that country; but, unhappily for the cause of progress, no sooner did the question come to be discussed, than dissensions arose, and the whole attempt has been rendered abortive. The same cause of disunion has operated in France as in this country. On the one side there were ranged the Members of the Dental Profession who had obtained the Diploma of the Medical Boards; and, on the other hand, those who had been in practice without a Medical qualification. It is greatly to be regretted that such should have been the case, but it may at least serve to teach us not to be surprised at the opposition which the College of Dentists has met with in this country.

In Germany, "The Society of Dentists," which was formed last year, held its Second Annual Meeting at Berlin in September last. The Society appears to be progressing favourably under the auspices of the leading members of the Profession.

In America, the same activity has been displayed as during the last few years. The Annual Meetings of the Societies have been well attended, and many useful and practical points have been discussed and elucidated. I have sincere pleasure in naming to you that the Pennsylvania Association of Dental Surgeons, in consideration of Mr Rymer's exertions in the reformatory movement, have nominated him a member of their Society. It is an act of courtesy which our Secretary has richly merited, and one which cannot fail to be appreciated by his Professional brethren.

In speaking of America, I must not omit to pay a passing tribute to one who has done so much to elevate and adorn his Profession: I allude to the late Dr Harris, than whom no Dentist has obtained a more universal reputation. He was the founder and a Professor of the Baltimore College, universally respected, professionally of highest eminence, and of strict integrity in his private character. His comprehensive and excellent work on the Teeth will be known throughout the world as the most practical book which has hitherto been presented to the Dentist. The success which has attended its publication is amply shown by the fact of its having passed through seven editions, the last of which appeared in 1858. In addition to this, which may be termed his great work, Dr Harris was also the author of a Dictionary of Dental Surgery. He was a constant contributor to the current literature of his Profession, and for many years edited the 'American Journal of Dental Science.'

The past year has been productive of several important additions to Dental literature. Dr Richardson's Lectures on the Teeth, originally published in the DENTAL REVIEW, have appeared in a separate form. In France, M. Forget has published a memoir, under the title of 'Dental Anomalies,' which received one of the prizes given by the Academy of Sciences in Paris. This work shows the serious disorders which may occasionally arise from irregular dentition, and the great advantages which may be derived from a knowledge of the teeth in diagnosing disease of the maxillary bones. M. Magitot, a Dentist in Paris of the highest scientific attainments, and well known for his researches on the formation and structure of the teeth, has also published a 'Memoir on Tumours of the Dental Periosteum.' Both of these publications have appeared in the pages of the DENTAL REVIEW, and too much praise cannot be given to the Editor of that periodical for the able and spirited manner in which the work is carried on; and I would particularly mention a series of excellent papers which have recently appeared in the REVIEW upon "The Teeth and Maxillary Bones in the Higher Order of the Quadrumana compared with those of Man." In the current volume of the 'Journal de Physiologie,' a most elaborate paper has appeared on the "Development of Teeth and Jaws in Man and Animals," the joint production of M. Magitot and M. Robin, the latter one of the most distinguished microscopists of France. These papers, although introducing some modifications of M. Guillot's views, yet in the main fully confirm the mode of tooth development set forth by that gentleman.

In America, the chief work which has been published is a separate volume on Operative Dentistry by Dr Taft, one of the Professors at the Ohio College of Dental Surgery. The varicus periodicals of that country continue to maintain their well-earned reputation, and fresh competitors for public fame have come into existence.

The time allowed me to address you is expired, but I will ask you to finally take in review the steady progress which Dental Science has made within these walls, and the high standing which, by following the principles we advocate, you will be sure to attain. I will ask for your kind co-operation in supporting the indefatigable exertions of our various Professors. I will beg you not to mistake the ill-shaded bursts of reproach and anger for the more substantial efforts of prosperity, and of high-minded and gentlemanly conduct. In looking dispassionately on allthis, I will once more ask you to rally round our banner, and give by your presence and sympathies such additional force as will safely elevate us to the height of our ambition, and to the consummation of our most ardent wishes for your reputation and prosperity.

Gentlemen, I thank you truly for your polite attention, and I trust that the Session about to commence will be productive of all those advantages which the Council of the College have so earnestly endeavoured to afford you.

A MEETING of the Court of Examiners of the College of Dentists was held on Wednesday, October 31st, when the following gentlemen were admitted Members of the College by Examination :—Robert Heygate Brooks, Banbury, Oxon ; William Laurence Canton, Hanover street, Hanover square ; William Chapman, Maddox street, Regent street ; Samuel Leon Finzi, City road ; Stephen Little, Bristol ; Harry Lyns Spencer, Orchard street, Portman square ; and James Sutcliffe, Bradford, Yorkshire.

ELECTION OF MEMBERS.—At a Meeting of Council, held on Wednesday, October 10th, the following gentlemen were elected Members of the College. MEMBERS.—Messrs T. R. Cameron, Paisley, and E. Matthews, London. ASSOCIATES.—Messrs F. Buck, T. Cole, N. Cox, R. Harrison, and J. R. Robinson, London.

ON WEDNESDAY, OCTOBER 10TH, the Second Session of the Metropolitan School of Dental Science commenced, when the Introductory Address was delivered by Mr Hulme, the Lecturer on Dental Surgery. The Lecture will be found reported in another part of the Journal. There was a large assemblage of the friends and pupils of the School, as well as of the Dental and Medical Profession. The Address, which was delivered *vive voce*, was listened to with the greatest attention throughout. At the conclusion of the Lecture, the President of the College of Dentists proposed a vote of thanks to Mr Hulme ; and the hearty manner in which this was responded to must have convinced him that his excellent and practical address was duly appreciated.

OBITUARY.—We regret to read a notice in the 'Medical Times and Gazette' to the effect that Dr Chasseir Harris is dead. While recording this sad piece of news, we may add, that we have received as yet no particulars of the event whatever. We, therefore, reserve all comment until our next impression.

⁂ THE great press of matter which has arisen during the past month, in consequence of the opening of the Dental School and the first Conversazione of the College of Dentists, has compelled us to postpone the continuation of Mr Hulme's and Dr Richardson's Lectures. These will however, be completed in the next number of the Journal.

THE

DENTAL REVIEW.

DECEMBER, 1860.

DR CHAPIN HARRIS.

We adverted last month, hoping almost against hope that the intelligence we imparted was incorrect, to the death of Dr Chapin A. Harris, of Baltimore, *par excellence* the representative of the Dental Profession in his own country, and in all countries. We regret now to have to state that the melancholy news is true, and that Dr Harris, after a long and painful illness, died at Baltimore, on the 29th of September last, in the prime of his life. We gather the following particulars of his career: He was born at Pompey, in Onondaga County, N.Y., in the year 1806. In 1830 he graduated as a Physician, and practised Medicine for some few years. Ultimately he adopted Dentistry as a profession, and adhered to that exclusively for the remainder of his life. In 1840 he founded the Baltimore College of Dental Surgery, and opened that new era in the history of Dental Science in America on which all the recent success of American Dentistry has rested. His labours in this new work, moreover, have not remained in the confines of the United States, but have travelled to this country, and have given to the Dentists of England the impulse that has carried them on so rapidly towards a new and complete organisation.

Having founded the Baltimore College, Dr Harris remained its leading spirit; and while engaged in the arduous duties incident to the Professorial position, as well as to those arising from a large practice, he contrived to steal from time the hours necessary for adding to literature a series of standard volumes in Dental Science and Art. The 'New York Dental Journal' thus classifies his literary labours:

"1. Dissertation on the Diseases of the Maxillary Sinus, 8vo; Philadelphia, 1842, pp. 160.

"2. Characteristics of the Human Teeth, &c., 8vo; Baltimore, 1841, pp. 119.

"3. Dictionary of Dental Science, 8vo; 1849, pp. 780. Second Edition, entitled Dictionary of Medicine, Dental Surgery, and the Collateral Sciences, 8vo; 1854, pp. 800.

"4. Principles and Practice of Dental Surgery, 8vo; Baltimore, 1839, pp. 384. Seventh Edition, 8vo; Philadelphia, 1858, pp. 892.

"5. Fox's Natural History and Diseases of the Human Teeth; edited with Additions, imp. 8vo; 1846, pp. 440. Second Edition, 8vo; Philadelphia, 1855.

"6. Désirabode, Complete Elements of the Science and Art of the Dentist. Translated from the French. 8vo, Baltimore, 1847, pp. 552.

"Professor Harris also translated several other works from the French language; he also edited the 'American Journal of Dental Science' from its commencement in 1839, more than twenty years, being assisted at various times by Drs Parmly, Brown, Maynard, Westcott, Dwinelle, Blandy, and A. Snowden Piggot. He also contributed to the 'Maryland Journal of Medicine and Chirurgery,' 'American Journal of Medical Science,' New York Dental Recorder,' and one or two other literary publications."

In private life Dr Harris's character was unimpeachable. Dr Parmly, Provost of Baltimore College, thus speaks of him:

"My long acquaintance with Dr Harris in the societies to which we belonged, and my more intimate connection with him in the Baltimore College of Dental Surgery, while I held the office of Provost in that institution, enable me to say, with truth, that I have never known a man of more generous impulses, or more genial feelings, than he whose death has awakened our sympathies, and brought so many of his professional brethren together to express their high respect for his professional character, their admiration of his attainments, and their exalted esteem for his moral, social, and personal worth.

"In his domestic relations, Dr Harris was exceedingly happy. His home was one of the most hospitable and delightful that I have ever known. His house and his heart were always open to all those who approached him with the remotest claim upon his benevolence and bounty, with a widely-extended philanthropy."

Of the literary works of our departed brother, we on this side of the Atlantic are able to form as correct a judgment as those who are of his own land. We have his works here; they have been well thumbed here, and they have been very freely quoted here—not always, we regret to say, with that recognition which a sterling honesty would dictate. Enough! we know the works, nor shall we be wrong in saying that they constitute at this moment by many degrees the first literature in the English tongue on the subjects on which they treat. Their language is clear, their style easy, and their matter, often original, is always sound, and always practical. In Professional politics Dr Harris was of the advanced liberal school. Though bred a Physician, he pronounced, as soon as his course in life was taken, for the entire and absolute independency of Dentistry; and he lived to see the fruits of his liberal exertions rewarded in a manner that could not, we think, have been fully anticipated by him in the most sanguine periods of his early and, we may well add, great career. Possessing a complete mastery over self, with a brotherly affection for all; hating that contemptible spirit of pride and exclusive political life which sneers at everything that is not formed after a certain model, but looking this spirit down with steady gaze,—he was happily selected by the Fates as the pioneer of a movement which will carry his name onwards so long as the Profession we claim allegiance to shall last.

The Chief of the Dentists is gone to his rest. Who shall succeed him? The Old and the New World may once more compete for the man who in our science shall stand foremost; and although at the present moment, on this side of the ocean, there is no one who alike in political success and scientific attainments can be said to represent Dr Harris, we have full faith that in the progress of our science England may now fairly compete with America in supplying competitors for his justly learned and world-wide fame.

RETROSPECTIVE.

THE present number of the DENTAL REVIEW brings to a close the second year of our literary labours. We refer our readers candidly to that which we have put on their shelves for a vindication of our exertions and proceedings. It is not for us, but for them, to judge whether we have fulfilled the promises which we set forth on the first pages of this work. But we know that we have tried, at least, earnestly and honestly to abide by our principles, and that, being led neither to the right nor to the left, we have steered straight on in the course which we marked out for our own guidance, and in which we trusted, and trusted securely, to find willing and able support.

Politically, we have consistently enforced the union of the whole Profession into one great incorporation. Retaining every possible respect for the Professors and Science of Medicine, we have urged, nevertheless, the advantages of entire separation of our Profession from that of Medicine. In this argument we have been fortunately aided by the Medical world itself: the voice of the Medical body has spoken loudly on our side—has recognised our intentions, sanctioned our arguments, and sympathised with our independency of principle.

We have supported the College of Dentists truly, and we shall continue that support—not, be it understood, as in opposition to particular individuals who like to be considered as *the* men against whom the College is raised, and who, in the phraseology of a great modern hero of fiction, are always saying, " Launch your arrows at us, if you will have the goodness "—not in opposition, we repeat, to these, whom once respecting, we are now driven to hold in forgetfulness, but in support of that policy of unity and freedom which we do not see exemplified or recognised in any other Dental Institution in this kingdom, except the College.

Scientifically, we have aimed to make this Journal the best Dental Journal in the country; and as in this respect we have had nothing to contend against, we may, without boasting, say that we have succeeded. We need not, however, permit this congratulation to hide the fact, that it is a very considerable and serious difficulty to keep a Dental Journal in a forward position, in comparison with periodicals representing other departments of human knowledgo. There need be no concealment of the fact, that English Dentists have been not as yet so drilled into scientific action, as to be able to enter the ranks of literature in competition with more advanced labourers. In this respect, nevertheless, a great change is coming over the scene. Our very political strifes have given to us a vitality for which we may be thankful; and now we have a promise of such sure scientific advancement, that the prospect of our own editorial career brightens with each succeeding year.

Finally, we have tried to introduce into our columns a better tone than prevailed, before our time, in the home literature of Dentistry. We have not considered it necessary to be maudlin in expression, nor reluctant to expose abuses: on the contrary, we have spent some time in the armoury as well as the cabinet. But, with it all, we have endeavoured to carry out, in both peace and war, a manner befitting to gentlemen, and worthy of the Members of a Profession which claims to be learned. That we have not altogether succeeded in vanquishing by example the uncouthness of contemporary literature, is but to admit that we have not attempted the impossible tasks of conquering instincts and of subduing propensities. These tasks we leave to time, which always carries them out in its own slow but ruthlessly exterminating way.

And now, wishing our readers, friendly or adverse, all the happiness which the coming year can bring—and holding ourselves ready at any moment to bury all differences if our common Profession be benefited thereby—we close this volume with nothing worse than a merry thought for its last page, and the hope that if not next year, some year, all Dentists of repute in this country will celebrate a new year with one accord.

ON THE TEETH IN THE VARIETIES OF MAN.

(Continued from page 527.)

THE Oceanic nations are referred by Ethnologists to two varieties or stocks—the Malayo-Polynesian, or Amphinesian, and the Kelœnonesian, or Negrito. The first has spread from the Malayan Peninsula to Madagascar on the one side, and as far as Easter Island on the other. It has peopled Borneo, Sumatra and Java, Formosa, Celebes and the Moluccas, the Philippines, the Pelew Islands, the Caroline and Marianne Islands, the numerous islands of Polynesia, Easter Island, and New Zealand. The type of this widely-spread race may be characterised as modified Mongolian; but although the affinity of the languages spoken throughout the vast area indicated points to a common origin, as might be expected the physical conformation of these insular tribes presents many diversities. In the colour of the skin, in the shape of the skull, and in other particulars, variations are met with, referrible to differences of climate, of soil and geological structure, of altitude above the sea-level, and of diet and mode of living. Into these it is not our province to enter. We at once proceed to an examination of the dentition of the Malayo-Polynesian race.

We have had an opportunity of examining the teeth in skulls from the Malayan Peninsula, the Philippine Islands, the Sandwich Islands, and New Zealand. We found a general correspondence with the type of dentition in the xanthous and leucous varieties. In the crania of individuals having the teeth unworn, the incisors, canines, and premolars presented no aberration from the standard configuration and proportions, whilst the true molars were of varying but usually moderate size. In the upper jaw, the fore and aft measurement of the true molar series varied from 1 inch 1 line to 1 inch 3 lines; in the lower jaw, the true molar series averaged 1 inch 3 lines in length. In some of the New Zealand skulls, an exact accordance of the true molars with the European type was noted; but in others we thought we perceived, not only in the greater length of the series, but in the breadth of the individual teeth, an approximation to the Melanian conformation. The dentes sapientiæ, which of all human teeth are subject to the greatest variety, are usually, in the Malayo-Polynesian, of typical proportions—that is to say, they are considerably smaller than the penultimates. Differences in the complexity of their implantation are of constant occurrence. In many instances they are inserted by distinct fangs, whilst occasionally the fangs of the third molars may be found as connate as is more usual in the Celt and Saxon. In this race, as in every other, the upper molar tooth becomes first worn on the inner half of the grinding surface; the lower, on the outer. We may notice, in passing, an abnormity which exists in one of the New Zealand skulls preserved in the Museum of the Royal College of Surgeons. In the lower jaw, only three incisor teeth are present; one occupying the median line, whilst a natural interspace exists between the left canine and the anterior bicuspid.

Amongst the inhabitants of the Malayan Peninsula, the East Indian Archipelago, the Moluccas, and Philippines, the practice of filing and dyeing the teeth appears to be universal. Of the former operation there are, according to Dr Latham, three varieties. The first consists in filing off the enamel from the anterior surfaces of the teeth. We have seen several crania of Malays, and also one skull from the Philippine Islands, in which this has been effected. In general, the operation appears to be limited to the incisors, canines, and anterior premolars. The practice is said to facilitate the reception and retention of the appropriate dye, which, in Sumatra, where a jetty blackness is aimed at, is the empyreumatic oil of the cocoa-nut. Even, however, if no dye be used, the constant habit of chewing the betel-nut is sufficient to stain the teeth thus filed of a black colour. Another form of the operation is the filing of each front tooth to a point; a third, which is practised among the Sumatran women of Lampong, is the filing away of the entire crowns down to the gum. It may be doubted, however, as Dr Latham observes, whether this complete destruction of the tooth be due wholly to art; for in most of the Oceanic tribes, including both the Malayo-Polynesians and the Negritos, it is no uncommon thing to find the teeth worn away to an enormous extent by attrition. So remarkable is this amongst the New Zealanders and some other islanders, that it is noticed by Captain Fitzroy, in his narrative of the surveying voyage of the Adventure and Beagle, in the following terms: "Before closing this slight description of the personal appearance of the Zealanders, I must allude to the remarkable shape of their teeth. In a white man, the enamel usually covers all the tooth, whether front or double; but the teeth of a man of New Zealand are like those of the Fuegians, and at first glance remind one of those of a horse. Either they are all worn down — canine, cutting teeth, and grinders—to an uniform height, so that their interior texture is quite exposed, or they are of a peculiar structure." He adds, in a note, "This apparent wearing away of the teeth is not found in the New Zealanders alone. The Fuegians, Araucanians, and Society Islanders show it more or less, and it is very remarkable among the natives of New Holland. I have seen some white men (Europeans) with similar teeth, but they were all elderly; whereas, in some young savages, I have noticed incisors shaped rather like those of a horse." We may observe that this remarkable destruction of the teeth by attrition is not constant among the New Zealanders. In only two of seven New Zealand skulls did we find the teeth in the extreme condition which Captain Fitzroy describes; in one the teeth were unworn and remarkably fine, in the others the effects of attrition were moderate. Again, the worn condition of the teeth in the Maori and other Oceanic tribes differs in no respect from that which we have already noticed as occurring more or less constantly in the Egyptian and Guanche mummies, and frequently in early British skulls; whilst, as has been before remarked, the unworn teeth present no exceptions to the common configuration and structure. We are informed by Dr Dieffenbach, that the Maori living on the borders of the lake Roturua have the enamel of the front teeth of a yellow colour. He attributes this to the action of the thermal waters, and remarks that the change produced does not appear to involve any impairment of the integrity of the teeth. Other differences also prevail among different branches of the Amphinesians. Thus, Mr Ellis describes the teeth of the natives of Tahiti as being always entire, except in extreme old age, and adds that, though rather large in some, they are remarkably white, and seldom either discoloured or decayed. On the other hand, in his description of the natives of the Gambier Islands, Captain Beechey asserts that the teeth, in one class especially, are not remarkable for evenness or whiteness, and seem to fall out at an early period. Again, the inhabitants of the Tarawan, or Gilbert Isles, are said to have small teeth—a characteristic which is certainly not common amongst the Oceanic tribes.

The survey of the dentition of the natives inhabiting the African Continent was commenced by some observations on the teeth of the Bushmen and Hottentots. It was demonstrated that no specific departure from the standard of human dentition accompanied their physical and mental degradation. But, although the lowest of African nations in the scale of humanity, the Quaiquœ race, in many points of structure—for instance, in the pyramidal shape of the head, the flatness and breadth of the face (dependent on the development and breadth of the zygomata), the obliquity of the eyes, and the lighter colour of the skin—exhibits a departure from the true Negro type, and an approximation to the Mongolian conformation. In the island continent of Australia, and in the neighbouring archipelago, on the other hand, we meet with a variety of Man geographically far distant from the African Negro, but physically presenting in many particulars a remarkable approximation to his type. Equalling, or, according to some, surpassing, the Bushman in moral and mental abasement, the Negrito or Kelœnonesian races of Australia, Tasmania, and New Guinea present, in the contracted cranium, the prognathous jaws, the black colour of the skin, and, above all, in the large size of the molar teeth, a nearer approach to the Negro of the Western Coast of Africa than is to be found on any other portion of the globe's surface. It is to the dentition of the Australian and Tasmanian branches of the Kelœnonesian variety that we now invite the reader's attention.

Professor Owen we believe to have been the naturalist who first called attention to the large size of the teeth, especially of the grinders, in the Australian. So remarkable and constant is this peculiarity, that, in a late Report on a series of Nepalese skulls, made to the British Association for the Advancement of Science, this distinguished authority alludes to it as one of the most characteristic of the differential points of structure by which a cranium of an Australian may be recognised. After some remarks which completely overturn the generally-received doctrines with regard to the ethnological limitation of the different types of crania, he observes: "Only with regard to the Australian and Tasmanian aborigines do I feel any confidence of being able to detect, in any single skull, offered without comment to scrutiny, the distinctive characteristics of a race. The contracted cranium, flat nose, prominent jaws, and more or less protuberant cheek-bones, are associated, in the Australo-Tasmanian race, with a peculiarly prominent supraciliary ridge, and deep indent between its mid part and the root of the nose: and still more peculiar and characteristic is the large proportional size of the teeth, especially of the true molars."

This characteristic at once strikes any observer who may examine a collection of Australian crania; but the questions then arise,—allowing its great frequency in this race, is it absolutely constant, how far is it liable to variation and limitation? And again, are the Australian dimensions never equalled in other races? As far as our field of observation has supplied data, we propose to answer these inquiries.

In the first place, the dimensions of the true molar series vary in Australian crania, not only in the length of the entire series, but in the breadth of the individual teeth. In twelve Australian skulls we found the antero-posterior measurement of the true molar series in the upper jaw to range from 1 inch 2 lines to 1 inch 4 lines; in five lower jaws we found the same series measuring from 1 inch 2½ lines to 1 inch 5 lines in length. The breadth of the moderately worn first upper molar varied from 4½ to 5½ lines. In one instance, in which this tooth was much worn down, the breadth of the upper surface was found to be 6 lines. Now, in the West Coast African negro, the true molar series of the upper jaw occasionally attains the length of 1 inch 4 lines, that of the lower jaw 1 inch 5 lines, in both cases equalling the extreme longitudinal measurement in the Australian. In the skulls of an Affghan, a Hindoo, a New Zealander, an American Indian of the Chenook tribe, a Patagonian, an Indian of Tierra del Fuego, and in an Early English skull, the fore and aft measurement of the same series in the upper jaw was 1 inch 3 lines respectively: in the lower jaw of the Affghan it was 1 inch 4 lines; in an Anglo-Saxon, 1 inch 4 lines; and in the Chenook Indian mandible, 1 inch 4½ lines. It will be observed that these measurements are all greater than the minimum noticed in the Australian. The greatest antero-posterior measurement of the true grinders we have noted is in the lower jaw of an Englishman, of abnormal stature, in the Museum of the Royal College of Surgeons: it is 1 inch 6 lines. Again, with regard to the breadth of the molar teeth, if we take the first molar, upper jaw, as an example, we have found its transverse measurement in the African Negro, the Sandwich Islander, and the New Zealander to be frequently 4½ lines, whilst in an Early English skull and in the skull of the Chenook Indian the transverse dimensions of the grinding surface of the same tooth were 5 lines, the latter being the average in twelve Australian skulls, in three of which the breadth of this tooth only equalled the former measurement. Admitting, then, to its full extent this peculiarity as a general characteristic of the Australian savage, we find it impossible to base on it a line of demarcation which shall isolate him from the human family—first, on account of the considerable variation to which the characteristic is liable in the Australians themselves; and secondly, because the attainment of considerable dimensions by the molar teeth is occasionally met with in the most widely separated varieties of Man.

Again, the bicuspides of the Australians are undoubtedly large: but they are not equally so; neither do they exceed the dimensions observed in some African skulls, or in exceptional cases amongst European populations.

The canines and incisors are usually thick and strong in the Australian, although it is not unfrequent to find them worn away almost to the alveoli. With regard to the unworn cuspidati, an extended comparison of Australian with African, Asiatic, and European skulls has not enabled us to say that they are more conical or acuminated, or that they present in any degree an approximation to the laniaries of the Gorilla or Orang. The incisors appear rarely to equal in size the incisors of the West Coast Negro; and when compared with the large grinding teeth, so far from exemplifying any approach to Quadrumanous proportions, they illustrate in its highest phase that contrast which is characteristic of Man. Lastly, the dentes sapientiæ, although smaller than the penultimate molars, are usually of large size, and their posterior tubercles attain greater development than is common in European races.* The complex implantation by distinct fangs is also the rule in the Australian. But even in these particulars exceptions occur. We have seen an Australian skull in which the upper wisdom exactly resembled the same tooth in the cranium of a Celtic Scot with which we compared it. It was considerably smaller than the penultimate, whilst the diminution, as in Europeans, principally depended on the minor development of the posterior internal tubercle. Again, we have observed an instance in the same race in which the three fangs of the upper third molar were conjoined; and we have noticed the same thing in a skull of an allied variety, the Papuan of New Guinea. Allowing that these are exceptions, they have occurred in a comparatively limited field of observation, and they must, at least, be supposed to represent numerous instances amongst the hordes which have peopled from time immemorial the vast Australian Continent.

The dentition of the almost extinct Tasmanian Negritos of Van Diemen's Land appears to conform closely to the Australian type. In one skull, however, the fore and aft measurement of the true molar series in the upper jaw was found to be only 1 inch 1½ lines. A similar abnormity to that already noticed in the dentition of a New Zealander exists in two female Tasmanian crania in the College of Surgeons. In each there are but three inferior incisors, the central one being implanted on the line of the symphysis and corresponding with the two upper central incisors. In these skulls no interspace accompanies the departure from the ordinary formula. In another female skull of the same race, the incisive alveoli are of the usual number. Caries appears rare amongst the Australo-Tasmanian tribes: in only one Australian and one Tasmanian skull have we found decayed molars.

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* It is remarked in the Odontography of Professor Owen, that in the third upper molar "a fissure extends, in many instances, especially in the Melanian varieties, from the middle of the grinding surface, at right angles to that dividing the two outer cusps, to the posterior border of the tooth." The passage does not imply any limitation to the dark-skinned races; but lest such a construction should be forced upon it, it may be remarked that the point of structure referred to is not unfrequently found in xanthous and leucous varieties. It has come under our observation in both European and Asiatic crania.

Allusion has already been made to the curious fact that amongst a race in physical structure so remarkably resembling the Negroes of the African Continent, the same expedients for disfiguring the countenance are in vogue. Dampier, the earliest voyager who has described the Australians, mentions having met with a tribe on the coast in whom the two upper incisors were invariably wanting; and in several of the crania which have fallen under our own notice the right median incisor has been extracted. How far the existence of such practices may be held to favour a community of origin, we must leave to be decided by Ethnologists.

The third division of the Kelœnonesian variety includes the Papuans of New Guinea, New Ireland, New Britain, Solomon's Islands, New Caledonia, and the New Hebrides. These races differ from the Australians, but resemble the Tasmanians in the character of the hair, which is strongly frizzled, or even woolly, whilst amongst the Australian tribes it is usually long and silky. The hair of the Papuans of New Guinea grows in separate tufts, and in this respect bears a striking resemblance to that of the Bushmen and Hottentots. The teeth of this division of Negritos, when compared with those of the Australian, display a marked diminution in the size of the grinding series. We have found in Papuan crania the antero-posterior measurement of that series in the upper jaw to range from 1 inch 1 line to 1 inch 3 lines, whilst the breadth of the first upper molars did not exceed 4½ lines. The wisdom teeth are also usually smaller than in the Australian, and appear to present in a larger proportion of instances a greater or less degree of union in the fangs. In the skull of a native of Erromanga, an island of the western division of the New Hebrides, preserved in the Osteological department of the British Museum, we observed that the fore and aft measurement of the lower molar series was only 1 inch 1½ lines, whilst in the upper jaw the same measurement was 1 inch 1 line. The upper third molar was small, and its fangs were connate for a considerable distance. Amongst the crania of the Papuan race we have not noticed that excessive amount of wearing away of the teeth which is so common in the Oceanic tribes. They resemble the Malays and Sumatrans in their constant use of the areca or betel-nut as a masticatory: this practice has the effect of staining their large mouths and lips of a blood-red colour, whilst at the same time it blackens the teeth.

The Fiji Islanders may be said to form a link between the Kelœnonesian and Amphinesian stocks: in physical conformation and colour they resemble the former, whilst their language is unequivocally a Polynesian dialect. There is a skull of a female from the Fiji Islands in the British Museum, in which the molars are as small as in the European: in another specimen of the same race we found that all the teeth were of European proportions, with the exception of the third upper molar, which was also inserted by three fangs. The length of the true molar series in both jaws in this instance was 1 inch 1½ lines.

We have dwelt thus long on the teeth in the Negrito races, because we are aware that they may be held by some to present ground for debate. We trust, however, it has been shown that the dentition of this isolated and degraded branch of the human family affords no sure basis for specific differentiation, whilst its peculiar features admit in no degree of being construed into a declension towards the dental characteristics of the Anthropoid Simiæ.

Our opportunities of investigating the condition and varieties of the teeth in the American Aborigines have been but limited, yet the specimens of various tribes which have come under notice have been fully sufficient to prove a close correspondence with the dentition of the inhabitants of the Old World; and this is especially to be noticed, as it is well known that the dental formula of the Quadrumana of South America differs from that of both living and extinct Apes and Monkeys of Europe, Asia, and Africa. It is stated by Professor Owen, in the Catalogue of the Museum of the College of Surgeons, that whilst the American skulls manifest an inferiority in the size of the molar teeth as compared with the Australian, the incisors, canines, and premolars are not smaller than in the black races. We may add, however, that it is equally true that individual differences are common. Reference has already been made to the large size of the grinders in the skull of a Chenook Indian: in this specimen the premolars, incisors, and canines conformed to the European standard. In the skull of a male Carib, from the Caribbee Islands, on the contrary, the premolars and canines were found to be as large as in Africans and many Australians. In some crania of flat-headed Indians of the Columbian River, the teeth which remained were of European proportions. In one of these we observed the upper third molar implanted by three fangs; in another, the roots of the same tooth were connate.

The upper wisdom teeth in American crania have appeared to us generally large, especially in the antero-posterior diameter of the crown, in this respect offering an approximation to the Melanian conformation. This we have noted in the skull of a Patagonian, in some Peruvian crania, and in the Chenook before referred to. The dentition in an elongated skull of an Ancient Peruvian did not present any considerable variation from the ordinary standard; the premolars were large, and the central upper incisors very concave posteriorly: this last peculiarity, however, was not repeated in other specimens. A curious abnormity presents itself in one Peruvian skull in the College of Surgeons' collection: one of the canine teeth has developed a second cusp on its inner side, giving it the appearance of a premolar.

Loss of teeth would seem to be more common amongst the Indians of the New World than amongst the Melanian races of the Old. We have noticed in an American Indian cranium the loss of the entire lower molar series on one side, with complete absorption of the alveoli: we do not recollect to have met with a similar instance in a Negro or Australian skull. Humboldt, indeed, asserts that the teeth of the North American Indians are but little subject to caries, although they are often worn down by the mastication of hard substances. We have it on good authority, however, that amongst the Potawatomi, a branch of the Algonquins, individuals of feeble habit or a scrofulous tendency rapidly lose their teeth by decay. Dentition is also said to be a painful process amongst the North American Indian children.

M. d'Orbigny states that the teeth amongst the Quichuas or Inca race of South America are always beautiful, even in old age: the same integrity of the teeth at an advanced period of life is attributed to the Charruas, and other midland nations of that continent. Wearing down of the incisors is, according to Captain Fitzroy, general amongst the Patagonians. The most degraded of the American tribes is that inhabiting Tierra del Fuego: in a skull of this race the teeth generally were observed to be of the ordinary configuration, and of moderate size; but the antero-posterior measurement of the upper true molar series was considerable—1 inch 3 lines. The molars were worn in the usual manner, the inner sides of the grinding surfaces of the upper, and outer of the lower, being principally abraded. Captain Fitzroy remarks the frequent wearing away of the incisors amongst the Fuegians. Dr Lund, a Danish geologist, who professes to have discovered fossil human skeletons in the Brazilian bone caves, characterizes the incisor teeth of the fossils as having the upper surface oval, and of longer antero-posterior than transverse diameter. On the supposition that he has not been mistaken as to the human character of the remains in question, it is most probable that he has fallen into a similar error with Blumenbach, in confounding the worn with the natural condition. Such a configuration of the unworn incisor teeth is not to be found in any known tribe of Indians: neither, as far as our information reaches, has it been discovered in any accredited skulls of extinct races.

The Esquimaux are to be considered as one of the principal links binding together the populations of the Eastern and Western hemispheres. In the skulls of this race the grinding teeth vary in size; in some instances they attain somewhat greater dimensions than is usual in the so-called Caucasian variety. In one specimen, although the first and second upper molars were not of inordinate proportions, the third was as large as the penultimate, and of the same size as in many individuals both of Oceanic and African Melanian stocks. Considerable wearing down of both cutting and grinding teeth, and caries of the molars, may be found in Esquimaux crania. In two skulls of Greenlanders, the dentes sapientiæ were observed to be of large size, with implantation by distinct fangs.

Turning now to the continent of Asia, we find but little in the dentition of the various Mongolian stocks which people the greater portion of its wide area to elicit comment. Amongst the Chinese we have noticed that the teeth are generally of moderate size, albeit displaying in individual instances those differences of proportion we have so frequently noted elsewhere. The premolars in some Chinese skulls are as small as the average in Englishmen; in others they may be characterised as large. Mr Tomes, in his Lectures on Dental Physiology and Surgery, notices an instance of a Chinese skull in which the upper anterior bicuspid has an implantation by three fangs, like a molar. This anomaly, although comparatively very rare, is peculiar to no race of Man. In the European, African, and Aboriginal American it has come under our own notice: the divided outer fang is often to be seen on one side only; it sometimes occurs in the anterior, sometimes in the posterior premolar, but rarely, if ever, is the abnormity developed in both. The molars in the Chinese are seldom of excessive size, but the greatest difference may be detected in the dentes sapientiæ: the upper wisdom may be nearly as large as the penultimate, and implanted by three fangs; or, on the contrary, as in one instance that has fallen under our own observation, it may be found of the smallest European size, almost reduced to the dimensions of a premolar. In no instance amongst a semicivilized or barbarous people have we seen the upper third molar so small as in the example here referred to. The inhabitants of Eastern India, Cochin China, and Siam constantly indulge in the use of masticatories of betel and quicklime, the Siamese adding catechu to the preparation. In the skull of a Veddah or aboriginal of Ceylon, we noticed the teeth stained, apparently from this practice. A black colour of the teeth, however, is not held in that island to enhance female beauty; for in a Singhalese description of a *belle*, we are told " that her teeth should be small, regular, and closely set, and like jessamine buds." In the Nepalese crania in the British Museum, the molars, as is remarked by Professor Owen, do not differ in size from the ordinary standard in the light-coloured races. In one of these skulls, that of a Murmi, we observed the upper wisdom inserted by three fangs, and quadricuspid. This complex implantation of the third molar will be found to be common amongst Hindoos, Mussulmans, and Turks. It is, therefore, as an ordinary characteristic, by no means confined to the Melanian variety. Neither does an oblique implantation of the incisor teeth alone occur amongst the Negroes and Negritos. The most remarkable case of obliquity of the front teeth we have ever met with is in the cranium of a Thug in the College of Surgeons.

The dentition of civilized Europe has throughout this sketch been assumed as the typical standard. We have, therefore, constantly alluded incidentally to its characteristics. The fore and aft measurement of the upper true molar series in the white races we have found to vary from 1 inch ½ line to 1 inch 3 lines; of the lower, from 1 inch 1½ lines to 1 inch 4 lines. The maximum in both cases has been obtained from crania of early inhabitants of this island. The greatest diminution of the third molars that has occurred to us has existed in modern English skulls. A complex implantation of the wisdom tooth is the exception; but as an exception it is not very rare. The remarkable wearing of the teeth which is so frequently noticed in Ancient British and Anglo-Saxon crania, is in the present day witnessed amongst the Esthonian Finns and the inhabitants of the Faroe Islands. In the latter case it is attributed to their diet, which consists of coarse barley bread, made without yeast, and baked in the hot ashes of peat fires, and of " rast," a putrid compound of the flesh of fish, fowl, Cetacea, and other Mammalia.* Messrs Thurnam and Davis notice that the molars in Ancient British crania are more obliquely worn than in the Anglo-Saxon. They attribute this to the fact that the Ancient Briton subsisted principally on imperfectly-cooked animal food, with instruments for the division of which he was ill provided; the Anglo-Saxons, on the other hand, lived to a great extent on cereals. Probably there is some truth in this, although instances of Anglo-Saxon crania in which the molars are worn very obliquely are not uncommon. But in all the varieties of Man, the manner in which the molar teeth are worn is essentially the same, however in degree the effects of attrition may differ. In the upper molars the internal tubercles, and of them the anterior one first, in the lower molars the external tubercles soonest exhibit the effects of use. It is interesting to notice that the crania of the more civilized Romans, which have been discovered in England, in the minor degree in which the molar teeth indicate the marks of rough work, differ from those of the conquered British and ruder Saxons. Caries is common amongst all civilized populations, but it has been from time immemorial peculiarly the scourge of the northern races of Europe. It was a frequent disease amongst the Aboriginal British and Anglo-Saxons; it is, probably, still more frequent amongst the modern Germans and English, whilst in the Anglo-American population it is said to form the rule rather than the exception.

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* Thurnam and Davis, 'Crania Brit.,' p. 33.

In laying before our readers this necessarily imperfect survey of the dentition in the varieties of Man, we are aware that it may be urged that no striking facts have been elicited, no new discoveries have been made—that the results obtained are mainly negative. For our own part, we shall be contented if the impression it may leave on other minds be that which the necessary investigation has produced on our own. We rise from it convinced that a study of human dentition affords an argument of the highest scientific value in favour of the declaration which, eighteen hundred years ago, reproved the national assumption of the self-styled Autochthones of Athens—" God, that made the world and all things therein, hath made of one blood all nations of men for to dwell on all the face of the earth." F. C. W.

A CLINICAL REPORT ON EPITHELIAL CANCER.

(Continued from page 515.)

THE LONDON HOSPITAL.

CANCER OF THE LIP—EXCISION—RETURN IN THE GLANDS—SECOND OPERATION.

(Under the care of Mr Curling.)

William N., aged forty, was admitted in July, 1853, with a large cancer of his lower lip. He had been a great smoker, and had had an irritable crack on the lip for a long time, but the disease had only been well marked for about two months. During the last few weeks the ulceration had been spreading rapidly. A sister of his had died of "cancer of the cheek." He was of dark complexion, and had the appearance of good health. Occupation, that of an engineer. The whole front part of the lip was excised by semilunar excision in July, 1853, and the wound healed quickly. On February 1, 1854, the man was re-admitted with an enlarged gland under the side of his jaw. The gland was as large as a walnut. He said he had first noticed it within a few weeks of the excision of the lip. It had caused him but little pain, and he had continued his occupation. On February 2, Mr Curling excised the diseased gland. The operation was attended by rather free hæmorrhage, but the man recovered well, and was afterwards lost sight of.

ST BARTHOLOMEW'S HOSPITAL.

CANCER OF THE LIP—EXCISION—RECURRENCE—SECOND EXCISION—RECOVERY.

(Under the care of Mr Lloyd.)

Daniel P., a florid man, aged fifty-two. He was not a smoker, but was accustomed to carry a small brush in his mouth. He was admitted for return of cancer of the lower lip in the cicatrix from a former operation. It first commenced twelve years before, and eight years ago was removed. It returned in the cicatrix in a month, and was re-excised. It remained well for four years, and then it once more returned. Nothing was done to it for four years, *i. e.*, until his admission under Mr Lloyd. Mr Lloyd then cut it away. It quickly healed. The man said that he had never had much pain in it. There was never any enlargement of the glands, and no history of hereditary tendency to cancer was obtained.

Mr Lloyd's last operation, the third to which the man had submitted, was performed on December 12, 1854. At the present date (October, 1860) the man is in good health, and free from any recurrence of the disease.

METROPOLITAN FREE HOSPITAL.

CANCER OF THE LIP—EXCISION—RAPID RETURN OF THE DISEASE IN THE GLANDS.

James M., aged seventy-one, was admitted August 31, 1856. A cancer of his lower lip had been excised in another Hospital one year before. He stated that he had had it three months before the operation. The disease had returned in the submaxillary lymphatics six months after the operation; and there was now a large glandular tumour, which had suppurated in the centre. The tumour was too diffused and too extensively adherent to permit of excision; and after a few weeks' attendance the man was, unfortunately, lost sight of.

THE LONDON HOSPITAL.

EPITHELIAL CANCER OF THE HARD PALATE.

(Under the care of Mr Curling.)

Henry A., aged fifty-four, admitted on September 1, 1854, a tall, stout, florid man, had applied at this Hospital on account of rheumatism, and attention was only by accident drawn to his mouth. He had had toothache for six weeks, and had observed a growth for four weeks, and for three had had some discharge. The tooth was decayed. There was no family history of cancer. Gout was hereditary in his family. He was accustomed to live freely, and smoked moderately. The whole of the right half of the hard palate was involved in a warty growth of epithelial cancer, which was in parts ulcerated and ragged. The cheek was œdematous. The whole gum was destroyed or involved in the disease. There were no enlarged glands. He was only in the Hospital a few days. No operation was performed.

METROPOLITAN FREE HOSPITAL.

CANCER OF THE TONGUE, EXTENDING TO THE TONSIL.

Mary Ann B., an unmarried woman, aged forty-three, was admitted into this Hospital, on August 22, 1856, for cancer of the tongue. It was situated on the right side, and extended far back. It was ulcerated, with sinuous margins, sloughy surface, and had a fetid smell. There was much induration in the substance of the organ, but it was not well defined. It was somewhat fixed, both below and to the tonsil. The tonsil was enlarged. The disease had begun six months before. She had a sharp tooth, which irritated the tongue, and was therefore removed. She had not had much pain in the tongue, until the last two months, and it had been more a soreness than of a shooting character. Her health used to be good, but since the tongue became affected she had lost flesh; but she was, however, still moderately florid.

In this instance, although the disease had existed but little more than six months, yet it had advanced so rapidly that all operative interference was out of the question, I shortly afterwards lost sight of the woman. It is not probable that she lived more than six months longer.

GUY'S HOSPITAL.

EPITHELIAL CANCER OF THE INSIDE OF THE CHEEK, EXTENDING TO THE JAWS AND THE SOFT PALATE—REMOVAL.

(Under the care of Mr Hilton.)

A man, aged forty-one, was admitted a few weeks ago for epithelial cancer of the inside of the left cheek, extending to the gums of the posterior molars of both upper and lower jaw, and also encroaching a little on the left velum. On the cheek it was the size of a crown-piece. The patient had first noticed the disease eight months before. Mr Hilton decided on removing the whole of the disease. Chloroform was given, and it was therefore expedient to prevent as much as possible the entry of blood into the mouth during the operation. Mr Hilton made an incision from the angle of the mouth to the anterior edge of the masseter, leaving at first the mucous membrane intact. Having ligatured all the bleeding vessels, he then divided the mucous membrane, and extirpated the whole of the disease. The dissection was carried as far back as the pterygoid processes of the sphenoid. The edges of the cheek were brought together by hare-lip pins. The patient has recovered well from the operation, and no deformity has resulted: there is now, however, an enlarged gland below the angle of the jaw, which is becoming hard, and is evidently secondarily affected.

CANCER OF THE TONGUE—EXCISION—RAPID RETURN OF THE DISEASE.

(Under the care of Mr Bryant.)

James G., aged fifty-one, a shipwright, was admitted, under the care of Mr Bryant, for cancer of the tongue. He was, apparently, in other respects a healthy man. There was a cancerous tubercle on one side of the dorsum, and extending through the whole thickness of the tongue. It had been first noticed six months before. Mr Bryant removed the diseased part, the patient being under the influence of chloroform. He passed a double ligature through the tongue behind the disease, and then an assistant dragged it forwards; he cut out the diseased portion. The wound healed quickly, and the man was discharged well. He was again seen on September 20. The disease had returned in the scar, and also in the other side of the tongue. There was also one enlarged gland under the jaw. His general health was still tolerably good. Mr Bryant does not contemplate any further operation.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

(Concluded from page 492.)

Discussion on the Treatment of the Dental Pulp.

One thing is certain, however, that at a period when such diverse modes of practice are advocated, it is a duty all owe the profession, to express their honest sentiments on this subject, so that we may get at the truth. The Church every few years deems it necessary, when the world appears to be going astray, to get up a revival ; every four years we have a political revival, during which, as politicians would have us believe, over and over again the Constitution has been saved. And if ever there was an occasion for a revival in Dentistry, now is the time ; and it is sincerely to be hoped that each and all will let the profession know where they stand on this all-important point.

Dr **Harris** remarked that discolouration of a tooth was but the result of the removal of the pulp, and believed in all cases it would ensue as a natural consequence. Many operators too hastily fill the pulp cavity before the vessels at the foramina are perfectly healed ; as a consequence, serum is poured out and inflammation of the peridental membrane is the result. Is therefore in the habit of keeping the tooth under treatment several days preparatory to filling. He agreed with Dr McQuillen, that the invariable success claimed by some is questionable, and believed every gentleman has failures, and no one could claim exemption. He also knew that pulps are destroyed under the impression that they are exposed, where a careful examination would prove that a thin covering of dentine still remained. Under such circumstances every effort should be made to preserve the vitality of the pulp. He regarded the perfect filling of the pulp cavity to be as essential as the compact filling of the cavity of decay.

Dr **Barker** remarked that he could fully agree with the latter portion of Dr Harris's remarks, regarding the perfect filling of fangs as necessary in all cases whenever it is practicable, and that the law that "nature abhors a vacuum" is as applicable to fang canals as in other parts of the economy ; and believed that if not closed by the dental practitioner, they would be filled with serum, which would eventually decompose and be carried by endosmotic action into the tubuli, and induce discolouration of the teeth. He could not agree with Dr Harris, that discolouration is due to the removal of the pulp, considering that if the fang canal and cavity of decay are compactly and solidly filled, no perceptible discolouration (except by reflected light) would ensue.

Dr **Fitch** doubted the position that discolouration of a tooth was due to the loss of its pulp. He had seen many teeth in which the pulp had been destroyed and fangs filled that remained for years without change in colour ; of course, there was a slight difference between living and partially dead dentine, but this difference is only perceptible to the dental eye. He thought discolouration was occasioned by foreign substances in the fang passing, by capillary attraction, into the tubuli; and thought that an *assumption* which claimed that it arose from the partial or entire want of the nutritive element furnished by the sheath of vessels entering the foramen of the root, was untenable. He was well aware that the health and vitality of the tooth depended to a very considerable degree upon the normal or physiological condition of the pulp, and believed that much vital force was received from the periosteal membrane, by the endosmotic current through the cementum; hence the health of a tooth was in a sense maintained after the loss of its pulp.

In numerous instances, the fangs of teeth were so imperfectly cleansed, and so rudely filled, that they became the seat of highly offensive matter and gaseous collections, which permeated the dental tissue, colouring the tooth structure and perniciously affecting the surrounding structures, rendering the tooth not only offensive, but making its preservation a matter of great suffering. Every one present must be conscious of the truth of this statement, if they ever have had occasion to remove such a stopping—the effluvia emanating therefrom is too offensive and nauseating to institute a comparison. Has been quite successful in restoring the complexion of discoloured teeth to a considerable extent, and would agree with Dr Harris, that the health of a tooth after the loss of its pulp depends much upon anastomosis; but seriously questioned the statement of the gentleman, that discolouration of a tooth was directly due to the loss of its nerve pulp. [As this position has been assumed by him, the proof of its correctness remains with him.] He would answer the question propounded by the gentleman, "What object has nature in placing this sheath of blood-vessels and nerve in the fang?" That the primary function of the pulp is the formation of dentine or tooth bone, and the preservation of the tooth in a proper physiological condition, enabling it to perform in the most efficient manner its high functions.

Dr **Flagg** did not consider that the discolouration of teeth was due to the removal of the pulp—wishing distinctly to be understood as referring to perceptible change of colour—and did not deny that the richness of vitality was in a measure destroyed; but contended that if the operation was properly performed throughout, it would require the dental eye and reflected light to detect it. Considered it due, firstly, to imperfect applications; secondly, to imperfect preparations of cavities and canals; and, thirdly, to imperfect plugging of either cavities or canals, generally the latter. Has recently seen a case of thorough canal plugging of Dr Planton's, which had stood, unchanged, the test of over twenty years. Stated that the removal of pulps was of much more than daily occurrence with him, and that he had as yet no reason whatever to anticipate discolouration; on the contrary, was constantly in the habit of effecting a restoration of colour to teeth, with the conviction from experience that it would be permanent. He referred to a class of discolourations, fortunately extremely rare, in which teeth, though the manipulation had been most perfect, would gradually assume a pinkish hue, and as years passed would become red, and finally brownish. Regards the red discolouration which sometimes results from treatment of the pulp, presenting itself in the course of a few hours and passing away almost as rapidly, as a pathological phenomenon quite different. Had as yet been unable to remove satisfactorily the *gradual* discolouration referred to.

Dr **McQuillen** said, the clear vital appearance presented by a perfectly healthy tooth is due to the translucent quality of the enamel and dentine, as well as the fact that the plasma circulating in the tubuli is nearly colourless. The ephemeral reddened condition that is occasionally attendant upon treatment of the pulp can only be accounted for by inferring that the red corpuscles have been ruptured, and the *hematine* or colouring matter (after mixing with the serum) is carried into the tubuli. This view certainly is more plausible than to suppose that the red corpuscles, which are the 1·3500 of an inch in diameter, could get into the tubuli, whose diameter is 1·10,000 of an inch, or ⅓ less. With regard to the permanent discolouration that teeth sometimes present, varying from a deep indigo colour up to a shade hardly appreciable from adjoining vital teeth, he believed that in the majority of cases, if not in all of them, it is owing to carelessness on the part of the operator, and the *liability* is greatly increased by *leaving the fangs unfilled.* At the same time, it must be borne in remembrance, that on account of the tubuli being relatively larger, there is a greater liability to discolouration in very young than in old teeth.

Dr BUCKINGHAM remarked, that no one could hope to meet with complete success in all cases where the pulp was treated, as the inflammatory tendency in some constitutions was of such a character that the slightest wound would run into that state ; but where the person is perfectly healthy the pulp could in most cases be removed, and the tooth give no trouble. He considered that when discolouration occurred from bad treatment of the pulp, the natural colour could not be restored ; and has noticed teeth that have been extracted, where one of the fangs would be very dark and the others of a natural colour, with the periosteum living upon each. He should like to know what change takes place at the apex of the fang. Are the foramina closed by an ossific deposit, or occupied by the remains of the pulp ? He had seen a preparation of collodion and chloroform suggested as an additional protection to the pulp when it is covered by a thin septum of dentine, and considered it might be useful in some cases.

THE ODONTOLOGICAL SOCIETY OF LONDON held the first Meeting of the present Session on Monday, the 5th inst. ; the President in the chair. Mr Bennett exhibited a model of an improved flask for vulcanising, the object of which is to produce vulcanite plates of uniform thickness, by a simple method, which was described to the Meeting. A paper was then read from Mr Belisario, of Sydney, advocating the late Dr Hullihen's operation of risodontrypy in the treatment of the dental pulp in certain stages. The writer considered that it was particularly applicable to those cases in which the pulp has been under treatment, capped, and permanently filled. The remainder of the paper was occupied with the details of a case in which a tooth had been under treatment for some five or six weeks, and then stopped. Pain having come on, and not yielding to leeches and purgatives, Dr Hullihen's operation was performed, and saved the tooth. Mr Belisario having stated in the course of his paper, that in the opening into the pulp cavity calcification had taken place, a somewhat animated discussion ensued as to the possibility of an inflamed pulp taking on the process of calcification. Some of the Members also demurred as to the propriety of ever making an opening into the pulp through a sound part of the tooth, where there was a carious cavity which could be used for that purpose.

COLLEGE OF DENTISTS OF ENGLAND.

MR HULME'S LECTURES ON THE STRUCTURE AND DEVELOPMENT OF THE TEETH.

On the evening of Tuesday, March 13th, Mr Hulme delivered his Fourth Lecture.

The present lecture commenced with a description of the teeth of the Cetacea. The characters of the teeth in these animals have already been noticed in the previous lecture. The Cetacea are the most exceptional of their class with respect to the number and characters of these organs. In the Whalebone Whale the teeth never pass beyond the rudimental condition; germs of them are found included in the jaw of the fœtal Whale, but their place is supplied in the adult animal by the plates of whalebone which are attached to the upper jaw and roof of the mouth. Some of these plates in the large Whalebone Whale are as much as fourteen or fifteen feet long, and from twelve to fifteen inches broad. There appear to be two series of them, placed on each side of the palate. In the Piked Whale there are about 300 in the outer rows, on each side of the mouth. The lower edges of these plates terminate in a fringe of coarse hair; these act the part of a filter upon the enormous draughts of water which the creature draws into its mouth, and which carry with them a multitude of minute oceanic animals. The water passes off, but the solid particles and the living beings are retained by the fringed extremities of the whalebone; the food is then crushed by the enormous tongue, and passed into the stomach through the constricted entrance of the œsophagus; for, large as is the Whale, it cannot swallow a mass of food bigger than what could be taken by the common Ox. In the Narwhal or Monodon, only one tooth is usually present, and that only in the male. This grows out in the form of a long tusk, which projects in front of the animal to the extent of four or five feet. Some of these teeth have been found measuring from twelve to fourteen feet in length. This tusk serves as a weapon of attack and defence; but Dr Scoresby also suggests that the animal uses it to make holes in the ice for the purpose of breathing. In the opposite jaw a similar tooth is present, but it usually remains in a rudimentary state; in the female neither of the teeth pass beyond the rudimentary condition.

The teeth of the remaining Mammalia may be roughly divided into those which are adapted for a vegetable diet, and into those which are suited for a carnivorous diet.

It may be remarked, that it is more especially the molar teeth which indicate the habits of the animal and the nature of its food. The most characteristic of the herbivorous teeth are the enormous grinding teeth of the Elephant, with which he crushes not only the young and succulent parts of the plant, but also the branches of the trees. These teeth are made up of a number of transverse plates, consisting of a central mass of dentine surrounded by a layer of enamel; the plates are united together, or, in other words, the intervals between them are filled up by cement. These substances being of different densities, they wear away unequally, the cement most rapidly, the dentine next, and, last of all, the enamel. The effect of this arrangement is, that the enamel stands up in ridges, and works into the depressions of the teeth in the opposite jaw, and thus forms a most efficient apparatus for grinding and crushing. The enormous size and weight of these molar teeth of the Elephant entail a peculiar mode of succession. The molar teeth make their appearance singly at the back of the jaw, and gradually advance towards its anterior part. The first tooth is worn away and discharged from the jaw before the second comes fully into use; and the same takes place in all the succeeding teeth. In this manner only one grinding tooth or portions of two are present on either side the two jaws at the same time. The Elephant is thus relieved from the weight which would arise from the presence in the jaws of a series of heavy molar teeth.

The *first molar* cuts the gum when the animal is two weeks old. It is nine lines in length, and six in breadth: it consists of four plates. This tooth is completely in place and in full use at three months, and is shed when the elephant is about two years old.

The *second molar* is two inches and a half in length, and from one inch to one inch and three lines at the broadest part. It has cut the gum nearly by the time when the first molar is shed; it is worn out and shed before the beginning of the sixth year.

The *third molar* averages four inches in length, and two inches in breadth. It begins to appear above the gum about the end of the second year, and is worn out and shed in the ninth year.

The *fourth molar* has a marked superiority of size over the third. It contains from fifteen to sixteen plates; it is from seven to eight inches long, and three inches in breadth. This tooth begins to protrude through the gum at the sixth year, and is shed about the twentieth or twenty-fifth.

The *fifth molar* measures from nine to ten inches in length, and about three inches and a half in breadth, and contains from seventeen to twenty plates. It begins to appear above the gum about the twentieth year. Its duration has not been ascertained by observation; but, says Professor Owen, it probably is not shed before the sixtieth year.

The *sixth molar*, which both Owen and M. de Blainville regard as the last, measures from twelve to fifteen inches in length, but is seldom more than three inches and a half in breadth: it contains from twenty-two to twenty-seven plates. "One may reasonably conjecture that the sixth molar, if it make its appearance about the fiftieth year, would, from its superior depth and length, continue to do the work of mastication until the ponderous pachyderm had passed the century of its existence."—(Owen, 'Odont.,' p. 635.)

The remaining teeth of the Elephant consist of two long, curved teeth, which project from the intermaxillary bones, and are therefore to be regarded as incisor teeth, which are converted into weapons of attack and defence. These tusks are also used for the purpose of uprooting the young trees, and must be regarded as a striking instance of the special modification of an organ in accordance with the habits and mode of life of the individual.

In the other Pachydermata the teeth consist of the two sets, and succeed each other in the usual manner. The grinding teeth, however, of these animals may be distinguished in different genera and families by the folds or pattens of enamel which mark the worn surface of their crowns. In the Horse the incisor teeth possess the great peculiarity of a fold of enamel in their centres, as well as on the exterior surface of the crown. Within the central ring of enamel is a hollow space in the young Horse, which becomes filled with the particles of the food and produces what is termed the mark. This, with the greater curvature of the tooth, serves to distinguish the incisor of the Horse from those of all other animals. In the old animal, when the crowns of these teeth have become worn down, there is no space in which the food can accumulate, and consequently no mark. The fraudulent dealer, therefore, in order to deceive the purchaser as to the age of the Horse, produces an artificial mark by means of a hot iron. In the lower jaw the mark disappears in the central incisors about the sixth year, in the second incisors at the seventh year, and in the third incisors at the eighth year. In the upper jaw the mark continues somewhat longer, and in both upper and lower its position is indicated for some years by a dark-coloured spot in the centre of the tooth.

The canine teeth are small in the Horse, and rudimental in the Mare, forming a kind of link between their full development and their entire absence (with some few exceptions) in the Ruminantia.

The dentine of the ruminating Quadrupeds is remarkable for the absence of the upper incisors, and for the complex structure of the molar teeth. The dental formula belonging to the extensive families of Antelopes, Sheep, and Oxen consists of—

$$\text{Incisors, } \frac{0-0}{3-3}\text{; canines, } \frac{0-0}{1-1}\text{; premolars, } \frac{3-3}{3-3}\text{; molars, } \frac{3-3}{3-2} = 32$$

The same formula also applies to the Deer tribe; only in some of these, as in the Muntjee, the Musk Deer, and some others, canines are developed in the upper jaw, and project from the mouth in the form of tusks.

In the carnivorous animals, of which the Lion, the Tiger, and the common Cat are typical examples, the grinding teeth are of a totally different character: instead of being broad, flat teeth, they are comparatively narrow, and terminate in sharp cutting points. The lower jaw, instead of having a large amount of lateral movement, by means of which the surface of the molar teeth are carried slowly over each other for the purpose of producing a grinding action, are limited to a perpendicular motion; so that the teeth of the Carnivora, to use the language of Cuvier, act on each other like the blades of a pair of scissors. The canines are exceedingly strong, conical-pointed teeth, sufficiently long to project over the margin of the opposite jaw, and very firmly implanted in their sockets. A space is left between the upper canine and the third incisor, in which the apex of the lower canine is lodged when the mouth is closed. A similar interval occurs behind the lower canine, between it and the first premolar, into which the upper tooth is received. It is by means of these powerful teeth that these animals are enabled to hold and lacerate their prey. The Lion will seize the body of a man, and, throwing it over his shoulders, hurry away with it to some secluded spot, where he may devour it at his leisure, with as much ease as the common cat will carry off a mouse or a rat. Small and insignificant as are the incisor teeth compared with these enormous canines, yet they are of essential service to the animal, by enabling it to strip off the tendons and ligaments, and to gnaw the cartilage from the extremities of the bones. Any one who has watched one of the large Carnivora at the Zoological Gardens when feeding, must have seen the animal place its fore-paws over the bone, and, having by this means fixed it firmly, rend away with its incisor teeth the parts just referred to. The dental formula of the family of the Felidæ is—

$$\text{Incisors, } \frac{3-3}{3-3}\text{; canines, } \frac{1-1}{1-1}\text{; premolars, } \frac{3-3}{2-2}\text{; molars, } \frac{1-1}{1-1} = 30$$

It is to Professor Owen that we are indebted for the correct determination of the homologies of these teeth. Cuvier divided the true molars into "carnassials" and "tubercular molars," regarding the large cutting teeth of the upper jaw as belonging to the series of true molars; but this, in reality, is not the case, inasmuch as they are successional teeth, and have been preceded by a temporary molar.

In the other families of Carnivora the molar teeth are increased in number: thus, in the Viverridæ, which includes the Civets, Genets, and Ichneumons, the dental formula is—

$$\text{Incisors, } \frac{3-3}{3-3}\text{; canines, } \frac{1-1}{1-1}\text{; premolars, } \frac{4-4}{4-4}\text{; molars, } \frac{2-2}{2-2} = 40$$

In the Dog there are—

$$\text{Incisors, } \frac{3-3}{3-3}\text{; canines, } \frac{1-1}{1-1}\text{; premolars, } \frac{4-4}{4-4}\text{; molars, } \frac{2-2}{3-3} = 42$$

In the Hyæna there are—

$$\text{Incisors, } \frac{3-3}{3-3}\text{; canines, } \frac{1-1}{1-1}\text{; premolars, } \frac{4-4}{3-3}\text{; molars, } \frac{1-1}{1-1} = 34$$

In this animal the molars are of extraordinary strength and size as compared with the canines, especially the second and third premolars, the base of the cone being surrounded by a strong prominent ridge. "An eminent civil engineer," says Professor Owen, "to whom I showed the jaw of a Hyæna, observed that the strong conical tooth, with its basal ridge, was a perfect model of a hammer for breaking stones for roads." It is with these peculiarly-constructed teeth that this creature crushes the bones which have been left by other animals when they have devoured the flesh of their victims, and from which the Hyæna still contrives to extract some portion of its food. The strength of the Hyæna's jaw is such, that in attacking a dog he begins by biting off his leg at a single snap (Buckland).

To the Carnivora belong the extensive group of Seals. These animals require to be arranged into two families—the first containing the true or typical Seals *(Phocidæ)*, whilst the second *(Trichicidæ)* includes only the Walrus.

The true Seals have the incisors usually small; but the canines are large and powerful, curved and sharp at the point, indicating the carnivorous nature of the animals. The molar teeth are remarkable for being usually furnished with only a single root; their crowns are strongly compressed laterally, with sharp cutting edges, which are usually more or less notched, and sometimes deeply cleft, so as to form three or more distinct points. This form of tooth is precisely that which will best enable them to penetrate the hard, slippery scales of their prey.

In the common Seal the teeth consist of—

$$\text{Incisors, } \frac{3-3}{2-2}\text{; canines, } \frac{1-1}{1-1}\text{; premolars, } \frac{3-3}{3-3}\text{; molars, } \frac{2-2}{2-2} = 34$$

The great peculiarity of the dentition of the Walrus is the enormous development of its upper canines, which project a considerable distance from the mouth, sweeping down in a long curve, the convex surface of it corresponding to the anterior part of the mouth. These teeth serve this animal as weapons of attack and defence, and as instruments to assist him in climbing the masses of ice which abound in those parts of the ocean which the Walrus inhabits.

On the evenings of Tuesdays, March 27th and April 10th, Mr Hulme delivered his Fifth and Sixth Lectures on the Structure and Development of the Teeth. The present lectures were occupied with the subject of the origin of the dental germ and the process of its calcification. The Lecturer observed that, attached to the mysterious and the unknown—discontented with the actual and the present—in the earlier ages of society, and in periods of superstition, man sought to learn the hidden things of the past, or to penetrate into those of the future. When civilization had taught him the folly and inutility of such inquiries, the same feelings retaining their influence over him, still guided his energies, but turning them in other directions. The investigation of Nature, a knowledge of the structure of his own body, and of the living forms by which he was surrounded, became some of the principal objects of his inquiries. Above all, it is the first origin of these living beings which he endeavoured to explain; but it is precisely at this stage of her operations that Nature became most obscure, and casts an impenetrable veil over this, the most interesting and most mysterious of her operations. It has been said, all that man can know is—what is, and under what conditions it exists; but even this amount of knowledge is a work of time, and man is condemned to pass through a long period of probation, learning how to learn. "We love better to believe than to examine," says Bacon; and in accordance with this dictum of the great apostle of modern philosophy, investigators have seldom been contented simply to record the facts which Nature placed before them, but, with a rashness too often proportioned to their ignorance, they have indulged in conjectures and theories which they vainly imagined would supply the place of careful and laborious investigations. Worthless as these theories are for the most part, they nevertheless mark the progress of the department to which they belong, and represent the amount and kind of knowledge which was possessed at the time they were promulgated, while their influence has often continued to be felt long after they have ceased to be regarded as true. In tracing the history of a science, we are often learning the science itself; while what is true with respect to the different phases through which it has passed, will, generally speaking, equally apply to its subordinate parts. Hence, before speaking of the opinions which have been entertained upon the origin and development of the teeth, it is necessary to glance at the doctrines which have been held with regard to embryology, or the development of the individual. Two theories have been put forth with respect to embryonic growth. The first and oldest is termed the theory of *Evolution:* it prevailed from the earliest periods until the eighteenth century, and includes amongst its advocates the most illustrious names which belonged to physiology during that long interval; amongst others, those of Haller and Cuvier. According to this theory, the parent contained within herself the germs which were destined to form a new series, or a new generation, from the very commencement of her existence; so that the act of generation consisted only in setting free these included germs. Hence, according to this doctrine, the first created of every species contained not only the germs of its own immediate offspring, but likewise the germs of all the succeeding generations belonging to that particular species of animals. The germ itself was a miniature representative of the perfect animal; all its parts and organs were present from the first, and if they could not be detected it was owing to our imperfect power of vision. Development, therefore, did not involve a long and regular series of changes, but was simply a process of growth, until, from being invisible, all the parts of the animal grew to their full size.

The second and more recent theory—that which is held in the present day, and is, in fact, the only one which could be held so soon as the microscope was applied to the investigation of developmental anatomy—is known as the theory of *Epigenesis.* According to this theory, the parent does not from the first contain within her the germs of her future offspring, but each new germ is a distinct production of the parent. The germ is not a miniature representative of the full-grown animal, differing only in all the parts being so minute that they escape the power of human vision: on the contrary, each part is seen to pass through a series of transformations before it attains the form and characters it will ultimately possess.

Such are the opinions which have been held with regard to general development; and such may be said to be the phases through which the doctrines relating to the development of the teeth have also passed.

The writers who first described the germs of the teeth, did so in the fœtus of the full period: at this time they are already far advanced in growth; ossification has commenced on the cusps of the molars and canines, and is considerably advanced on the crowns of the incisors. It was at this stage of their development that Eustachius, in 1563, described them: he detected the presence of the germs not only of the first set, but also of the incisors and canines of the second set. He says:

"On dissecting a child immediately after birth, both jaws being laid open, the *incisores*, *canini*, and three grinders appeared, partly gelatinous, partly bony, of no small size, and completely surrounded by their sockets: but, having carefully removed the *incisores* and *canini*, I observed a very thin interstice, scarcely converted into bone; which being removed with equal care, I discovered the like number of *incisores* and *canini*, almost gelatinous, and of a smaller size, which, lying behind the former ones, and in their proper cavities, were placed directly opposite one another. I confess I did not see any trace of the grinders and jaw teeth, which appear about the seventh year."

This record of simple facts is very different from the conjectures of Diemerbroch and others, who imagined that the permanent teeth were produced from the roots of the temporary; or from that of Fallopius, who supposed that a certain latent seed in the jaws produced a new range of teeth.

No further advance was made in this subject until the appearance of Hunt's work in 1778, and that of Blake in 1798. These writers commenced their examination as early as the fourth month of fœtal life, when Blake detected the germ of the temporary teeth of the anterior permanent grinders; at eight months he perceived those of the incisors and canines of the second set. These germs, he believed, were derived by a process of budding germs from those of the first temporary teeth.

It is evident that we have here no account of the actual origin of the teeth germs, but only of a certain stage of their development.

The opinions put forth by Blake continued to be repeated by subsequent writers on the teeth, until the appearance of Mr Goodsir's paper *On the Origin and Development of the Pulps and Sacs of the Human Teeth*, in 1839. According to this writer, about the sixth week of fœtal life, preparations are beginning to be made for the development of the teeth. A groove is formed along the course of the upper and lower jaws, within which the germs arise. Each tooth commences as a small papilla, and processes from the sides of the groove are given off, which approach and finally meet before and behind the papilla, so as to enclose it in a follicle, through the mouth of which it may be seen; it subsequently sinks down, the aperture is closed up, and each germ is converted into a well-developed follicle. This constitutes what Goodsir terms the follicular stage of development. This is followed by the second or saccular stage, and is the one with which anatomists have been so long familiar, during which the papillæ are pulps, and the open follicles which contain them are shut sacs, where the tooth substance and the enamel constituting the teeth themselves are deposited. The third or eruptive stage includes the completion of the teeth, the eruption and shedding of the temporary set, the eruption of the permanent, and the necessary changes in the alveolar processes.

MICROSCOPIC STRUCTURE.—The simplest structural condition of the mammalian teeth occurs in some species of Armadillo. In the teeth of the three-banded Armadillo, the small cylindrical teeth appear to consist of only one kind of bone, as Retzius has stated; but Owen asserts there are two. The tubes are finer than those of the human tooth. They pass in an undulating manner from the pulp cavity to the outer surface of the tooth, giving but little evidence of their subdivision or branching. The great peculiarity of these teeth is the presence of a peculiar network in certain parts, indicating a cellular structure of the intertubular or basal substance of the tooth, reminding one of what is seen in the teeth of the aquatic Mammalia. The teeth of the Orycteropus, or Cape Ant-eater, are very peculiar and exceptional as regards their structure in the mammalian animals; in a transverse section they bear a strong resemblance to those of the Eagle Rays. There is no large pulp cavity, as in other teeth; but at the base of the tooth a number of pulp processes are given, of which each becomes the centre of a system of calcigerous tubes, radiating from the pulp process and forming a long slender denticle. The different denticles are united together by an intervening layer of cement cells, and the whole forms a single compound tooth.

The teeth of the Sloths contain a central axis of vascular dentine, equal to half the thickness of the tooth: this is surrounded by a layer of unvascular dentine, and the whole is surrounded by a coating of cement, which is not so thick as the hard dentine. These teeth are of continuous growth, and the medullary or vascular canals measure from the six-hundredth to the thousandth of an inch in diameter, with intervals of twice or thrice that breadth. These canals pass from the surface of the pulp at right angles to the hard dentine; those from the summit of the pulp are nearly parallel with the axis of the tooth. These canals contain processes of the pulp, and are surrounded by calcigerous tubes; these sometimes bifurcate, and more rarely anastomose by loops, the convexity of which is turned towards the hard dentine. The same kind of structure is shown in a still more remarkable in the extinct and gigantic Sloth, the Megatherium from South America. In these animals the centre of the teeth contained a mass of vascular dentine, through which processes of the pulp were continued towards the surrounding hard dentine, and terminated opposite to this structure in a series of loops. The interspaces of these pulp processes are filled with calcigerous tubes, which communicate with very minute cells, much smaller than those which are formed in the cement. The cement forms a large portion of these teeth, and is remarkable for the size, number, and regularity of the medullary canals which traverse it: these also terminate in loops, whose convexity is directed towards the layer of hard or unvascular dentine; these send off fine calcigerous tubes, which communicate with the caniculi from the bone-cells, which are dispersed in large numbers throughout the cement.

In the Walrus, the Sperm Whale, the Dugong, and the Narwhal, the teeth consist of two kinds of bone—viz., dentine and cement, the layer of the latter element being of unusual thickness. In all these teeth, the dentine is characterised by a network of cellular structure, and minute opaque spots, which appear to originate at the junction of the cells with each other. The cement differs more than the dentine; in all it is very thick, and contains numerous layers of bone-cells, with minute tubuli radiating from them. In the Narwhal, the cement is characterised by short, straggling dentinal tubes, occurring in large quantities, and running obliquely from the outer to the inner surface of the cement: one tube does not pass through the entire thickness of the cement, but they are arranged in something like layers. The tubes themselves give off a number of fine short branches in parts of the cement of the Narwhal, especially where the section is a little thick: the appearance of these tubes and their branches might be compared to small bundles of sticks.

In the teeth of the common Porpoise, the crown of the teeth is covered with a distinct layer of enamel, resembling that which is met with in the teeth of the higher Mammalia. The fangs of the teeth are invested with a layer of cement containing lacunæ, and the dentine possesses the same peculiar network distributed over it as has been mentioned as occurring in the Whale, Narwhal, Dugong, &c.

In the Seal, the crown of the tooth is covered with enamel; and around the enamel there is an unusually thick layer of cement, containing numerous small lacunæ. The dentine possesses the same cellular network, spread over, as in the previous instances; and very often there are large irregularly-shaped black masses, corresponding to the interglobular spaces of Czermac.

In the remaining Mammalia, the chief peculiarities are met with in the Marsupialia, the Rodentia, the Elephant, and the Ruminantia.

In the first of these animals, the dentinal tubes, as shown by Mr Tomes, pass into the enamel, and even subdivide within its boundaries. In the Rodentia, the anterior surface of the incisors is provided with two layers of enamel, whose fibres pass in different directions. In the Elephant, the tusks or incisor teeth consist only of dentine and an outer investing layer of cement. The peculiar appearance of this well-known material depends upon the minute size of the tubes, which at their commencement do not exceed the five-thousandth of an inch in diameter; upon their close arrangement at intervals scarcely exceeding the breadth of a single tube; and, above all, upon their strong and almost angular gyrations.

The dentinal tubes, as they radiate from the pulp cavity, incline obliquely towards the pointed end of the teeth, and describe two slight primary curves—the first, convex towards that end; the second, and shorter one, concave. These curves, in narrow sections, from near the open base of the teeth, are almost obscured by the strong, angular, parallel, secondary gyrations. The tubes divide dichotomously, at acute angles, and gradually decrease in size as they approach the periphery of the ivory, where they subdivide, send off many minute branches, and terminate in a thin layer of basal substance, of a yellowish colour by transmitted light, which divides the ivory from the cement. In sections from the extremity of the teeth, the ivory itself presents a modification of the exterior layer, which is analogous to cement.

The characteristic appearance of decussating curved striæ with oblique rhomboidal spaces, so conspicuous on transverse sections or fractures of ivory, is due to the refraction of light caused by the parallel secondary gyrations of the tubes above described. The strong contour lines observed in longitudinal sections of ivory, parallel with the cone of the pulp cavity, and which are circular and concentric when viewed in transverse slices of the teeth, are commonly caused by strata of extremely minute opaque cellules, which are unusually numerous in the interspaces of the tubes throughout the substance of the ivory, and, by their very great abundance and larger size in the peripheral layers of the ivory at the extremity of the large tusks, give them the character of cement. The close-set lateral branches of the calcigerous tubes unite with the tubuli of these minute cells. The decomposition of the fossil tusks into superimposed conical layers takes place along the strata of the opaque cellules, and directly across the course of the calcigerous gyrating tubes.

The cells of the cement layer are more uniform in size and shape, and more circular, than in ordinary teeth. The long axis of the more elliptical is parallel with the plane of the stratum of cement: their diameter is the two thousand five hundredth of an inch, and the interspaces which separate them are not greater.

In many of the Ruminantia—as, for instance, in the Calf—there is a distinct layer of enamel continued over the surface of the enamel which invests the crowns of the incisor teeth. The remaining peculiarities of the microscopic structure of the mammalian teeth relate to the diameter of the dentinal tubes, the intervals by which they are separated from each other, and similar minute details; but they are all composed of a central mass of compact dentine, having a layer of enamel on the crown of the teeth, and one of cement around the fangs.

These opinions of Goodsir had been universally adopted until the appearance of a paper by M. Natali Guillot, in the 'Annales des Sciences Naturelles.' According to this writer, the germs of the teeth make their appearance as minute spheroidal masses in the substance of the material out of which all that part of the face is developed. The spheroids become divided into three parts: a central mass, which forms the pulp of the tooth; an outer layer, which afterwards forms the sac of the tooth germ; and a middle layer, which becomes the enamel germ. These observations of M. Guillot have since been confirmed in all essential particulars by MM. Robin and Magitot.

With regard to the calcification of the dentinal germ, four doctrines have been held. The oldest of these is that which has been spoken of as the theory of *Ossification*. According to this, the pulp became converted into the osseous substance of the tooth. The second is termed the theory of *Secretion*, according to which a fluid is secreted, which is then moulded upon the surface of the pulp, and becomes converted into dentine. This was the doctrine held by Hunter, Blake, and their contemporaries. The third has received the name of the *Conversion* theory, and has been advocated by Owen, Nasmyth, and others. This differs from the theory of ossification inasmuch as all the elements of the pulp are not concerned in the process of dentification, but only certain nucleated cells, which arrange themselves on the surface of the pulp, where ossification is about to take place : these become elongated, and, uniting with one another, constitute the dentinal tubes. The last doctrine which has been put forth is one by Professor Huxley, but originally suggested by Raschow, and which has received the name of the Theory of *Deposition.* Huxley considers that the elements of the pulp take no direct part in the development of the dental tissues, but become either absorbed or pressed in by the gradual increase of the latter. He considers that,—1. The teeth are true dermic structures, formed by the deposit of calcareous matter beneath the basement membrane of a dermic papilla ; 2. That neither the capsule nor the enamel organ contributes directly in any way to the development of the dental tissues, though they may indirectly ; and concludes by stating that the Conversion theory is as incorrect as the Excretion theory, and that the dentine is formed, not by ossification of the histological elements of the pulp, but by deposition in it.

Amidst the conflicting opinions which are held with regard to the exact share taken by the elements of the tooth germ in the ossification of the tooth, most writers are now agreed that the dentine is formed through the agency of the nucleated cells of the pulp ; the enamel, by means of the middle layer of the germ, commonly known as the enamel organ ; and the cement, through the outer layer or sac of the tooth germ, which, after the formation of the crown of the tooth, becomes adherent, extends itself over the fang, and forms the cement. In the lecture, the views of Lent, Kolliker, Nasmyth, Magitot, Huxley, and others were given in detail ; but all these may be arranged under one or other of the above theories.

At the conclusion, the President highly complimented Mr Hulme on the great care which had evidently been bestowed on the various subjects treated of in these Lectures, and proposed a vote of thanks to the learned gentleman, which was unanimously agreed to.

DR RICHARDSON'S LECTURES ON ANÆSTHESIA AND ANÆSTHETICS.

(Reported by Mr JOHN DRISCOLL, Associate of the College of Dentists.)

LECTURE IV.—TUESDAY, MAY 22, 1860.

SYMPTOMS OF ANÆSTHESIA AND ADMINISTRATION OF ANÆSTHETICS.

DR RICHARDSON, after a brief *résumé* of his last lecture, opened the present lecture by proceeding to explain the phenomena of anæsthesia, and the different actions of anæsthetics. With regard to the class of narcotics that produce their effects by catalysis, of which class chloroform at present stands first on the list, these are absorbed by the blood, and remain for some time in the system: they are gradual in their effects during their action, not only during the successive periods or stages of insensibility, but during those stages also which mark recovery. Those narcotics, again, which produce their effects by negation, and of which we may take carbonic acid gas as an example, are different in their effects, there being no distinctly progressive advancement through defined stages. Insensibility is quickly and suddenly produced by these, and the return to consciousness, when it occurs, is almost immediate and perfect. Dr Snow describes chloroform as giving four successive degrees in producing its effect upon the patient. The first degree is that of excitement: this stage lasts from one to two or three minutes; it is attended by a resistance of the muscles. The second degree is attended by tendency to, or by actual convulsion and violent action of the heart; the pulse is always quick and small, and the patient often gets violent and very loquacious: patients, nevertheless, on their return to consciousness, rarely have any recollection of what they have said or done in this degree. The third degree is attended by the complete annihilation of consciousness and movement; the muscles are relaxed; the pulse is at first full and quick, then moderately slow, until it subsides into the natural pulse; the eyeball is rolled up; "and it is worthy of notice that when this last fact occurs in the administration of any anæsthetic, it is a sure sign that the patient is ready for the performance of an operation." The recovery from this stage generally takes place within four minutes. The fourth degree is attended with very great prostration; the breathing becomes stertorous and noisy; there is an entire paralysis of the body, and, occasionally, spontaneous evacuations. This stage is very dangerous, and is seldom employed unless great relaxation of the muscles is required. Dr Richardson on this occasion subjected a dog to the vapour of chloroform, and kept the animal in it until the fourth degree had commenced; he then removed the dog, and its stertorous breathing was plainly audible.

Ether has a prolonged first degree, and a very short second; and we can go no further than the third without destroying life: the pulse is excited throughout every stage; the eyeball rolls up in the third degree as in chloroform, but the breathing is more difficult, and on the whole there is a greater appearance of drunkenness than under chloroform.

The administration of amylene is attended with scarcely any excitement, either mentally or physically, the patient sinking rapidly into the third degree. The great difference between chloroform and amylene is, that there is less perfect abolition of consciousness during the administration of the latter. (Vide Lecture I.)

Carbonic oxide, fumes of Lycoperdon, and Dutch liquid, produce nearly the same phenomena as chloroform. Olefiant gas is more slow; and opium differs in having a long first degree, no second degree, but a very long third degree.

The reason of anæsthetics producing sickness seems to be that they are brought by the blood to the mucous membrane of the stomach, there to be eliminated and evacuated; their presence there causes the irritation. Dr Richardson related an experiment he had made with reference to this: he killed a rabbit with chloroform, and afterwards produced complete anæsthesia on a mouse by merely confining it in a chamber with the rabbit's stomach, thereby thoroughly proving the presence of chloroform. Sulphuric ether, carbonic oxide, fumes of Lycoperdon, Dutch liquid, and monochloruretted Chloride of Ethyle, have the same effects as chloroform in producing sickness. Amylene differs, there frequently being no vomiting, and when it does occur, it is very slight. It is almost an impossibility to procure an anæsthetic that will not cause sickness; but if we could get one, it would be invaluable, as sometimes the vomiting is very serious. In one case on record a patient vomited for no less a time than sixteen hours. With regard to a remedy for this sequence of anæsthesia, opium is the best.

After taking all these anæsthetics and their phenomena into our consideration, we must come to the conclusion that there are none at present equal to chloroform; not because it is the least dangerous, but because it is easily inhaled, and because there is never that perfect rest and quiet with other anæsthetics that there is with chloroform. With ether, the patient constantly begins to rally before the operation is finished. Dr Snow was once asked why he used chloroform in preference to sulphuric ether, or other anæsthetics less dangerous? His answer was, "that he used it for the same reason that he used a lucifer match instead of the old tinder box; not because it was the least dangerous, but because it was the most applicable."

A question that is very frequently asked is—Will eventually any other anæsthetic supersede chloroform? Dr Richardson is of opinion that that may be the case: Dutch liquid and amylene—the latter would be the best if we could get it pure—are, in fact, nearly equal to chloroform. There is no doubt but that great advantages would be derived by entirely excluding both chlorine and oxygen from the compositions of an anæsthetic.

In reference to the question, whether it is necessary to examine a patient previous to administering chloroform? Dr Richardson expressed an opinion that it was very necessary; differing in that respect from Dr Snow, who said that no examination was at all necessary, and for his (Dr Snow's) part he always left it to the Surgeon indiscriminately; his practice teaching him that when an operation was justifiable, narcotism was justifiable. Out of 4,000 cases in which he had administered chloroform, only one death occurred. For all this we must remember that an examination should be made, as it can do no harm, and may be the means of preventing evil. Further, Dr Richardson did not approve of the administration of chloroform in simple operations—as, for instance, the extraction of a tooth—as a general rule, but only in great operations, where operative proceeding is necessary for the saving of life.

Previous to the administration of an anæsthetic, attention should be paid to the diet of the patient: it should be a rule, never to administer the vapour until two hours after food has been taken into the stomach, or severe vomiting may occur. The last meal that is taken previous to inhalation should be a light one: a glass of sherry or brandy may be administered without any harm, previous to the inhalation of the chloroform; in fact, it will do good if the patient is nervous. The proper position for the patient is a semi-recumbent position; and after the patient is once placed in the position he is to occupy, he should not be moved, as movement is apt to cause faintness. In one case that Dr Richardson witnessed of an operation on the lip under the influence of chloroform, they laid the patient down, causing him to faint immediately. The reason of this is, that change of position always alters the pulse. Thus, the pulse which would give in an upright position seventy-five beats in a minute, would give in a sitting position seventy, and from sixty to sixty-four, in the horizontal position.

The mode of administration of chloroform was important. Professor Simpson never administered it but on a handkerchief or napkin: but this is a very dangerous practice, and cannot be too strongly reprehended; it is objectionable on many grounds, for some people take in more air than others in inspiration, and it is impossible to tell how much the patient is inhaling. By this method, also, a large portion of the chloroform escapes, and mingles with the atmosphere, to the annoyance of the operator; but, perhaps, the greatest argument against this method of inhalation is, that out of the whole number of deaths that have taken place during or from the administration of chloroform, there are only ten fatal cases where a proper inhaler was used; in all the other cases the chloroform was administered on a towel, handkerchief, or napkin. In one case of a boy that died recently while under the influence of chloroform, it appears that the operator laid a handkerchief containing chloroform over the boy's face while proceeding to operate. The boy died from deficiency of air and excess of chloroform, both causes acting together.

Having come to the conclusion that chloroform ought to be administered by an apparatus, the question arises, which apparatus is the best? Dr Sibson's mouthpiece is a very good one, but Dr Snow's inhaler is the very best. It consists of an inner and outer case: the outer case is filled with water, and by this simple arrangement the chloroform is always kept at a uniform temperature, which is a great point, but the chief feature of this inhaler is, that it regulates the inhalation; it is of little consequence what amount of chloroform is put into the instrument, as the patient can breathe no more than 5 per cent. at any time. Two drachms is a very good quantity to put in to commence with, and is generally sufficient to produce anæsthesia; afterwards, eight or ten minims added every three or four minutes will be quite sufficient to keep the patient in the narcotized state.

In one case in which Dr Richardson administered chloroform, he kept the patient (a tall man) in an anæsthetic state for thirty-seven minutes, and only used three drachms of chloroform from beginning to end: had he wished to keep the patient insensible for that time by the handkerchief process, he would probably have had to use at least two ounces.

Ether is best administered on a sponge. Dr Hayward was the first to introduce this method.

Amylene is usually administered in quantities of four drachms; frequently, however, from eight to ten drachms will be required to produce the desired effect. Dr Snow's chloroform inhaler is the best that can be used for this anæsthetic.

Dr Richardson here particularly requested the attention of his auditors to the following necessary rules to be observed by the operator in the administering of an anæsthetic.

In chloroformization, the first and second degrees are the most dangerous; in the first degree, be careful to watch the effects of the chloroform in relation to production of cough and irritation of the throat: if these occur, remove the chloroform for a moment. In the second stage, observe for convulsion; and if that is great, remove the chloroform. As the third stage comes on, observe the eye of the patient, for the first indications of the ball rolling up.

The finger must be kept all through on the pulse; and if any cessation is felt, withdraw for a moment the narcotic. In giving chloroform, every sense must be trained: the eye, to see expression and action; the touch, to determine the pulse; and the ear, to seize as acutely as possible the breathing of the patient, and to ascertain whether the respiration is in any way impeded.

Lastly, there are two indications which show that the patient is ready for operation: when the eyeballs are turned upwards, and there is no flinching on touching the eye, insensibility is complete, and the operator may proceed, *cito et tuto.*

LECTURE V.—TUESDAY, MAY 29, 1860.

CAUSES WHICH MODIFY THE ACTION OF ANÆSTHETICS.—DANGERS INCIDENT TO ANÆSTHESIA.

This lecture was commenced by the observation that age exercises a great influence on the action of an anæsthetic of any kind, either volatile or solid: young children are more speedily and entirely brought under the influence of narcotics than are adults or middle-aged persons. In old persons verging on their second childhood, narcotics, again, are speedy in their action, though not quite to the extent that they are in the young: this property extends to all anæsthetics. At the same time, it is worthy of notice that *volatile* narcotics are more safe to administer to children (on account of the quick respiration) than they are to adults, and no death has been known to occur from the administration of chloroform to children under five years of age. The solid narcotics, on the contrary, are very dangerous to administer to children.

The old are brought much more easily under the effects of chloroform than are middle-aged persons. There are, of course, exceptions to every rule. Females, as a rule, also are more speedily rendered insensible by chloroform than males: but here, again, there are exceptions. We may further set it down as a rule, that people of a strong physical formation, with a powerful, vigorous frame, are the most difficult to bring under the influence of an anæsthetic: Dr Snow says, that the only case in which he ever had any difficulty in bringing a person under the influence of chloroform was an athletic. Much depends on the formation of the chest: for we find that a person with a small, narrow chest, and quick respiration, is very easily narcotised; with a broad-chested man the reverse obtains. Dr Richardson once saw a young man rendered completely insensible in fifteen inspirations; and from the experience that he (Dr R.) has had, he can generally tell by looking at a patient how much chloroform will be requisite to put the patient in an anæsthetic state. The action of anæsthetics may be modified by disease. Hysteria sometimes produces a negative effect upon the action of chloroform. Dr Snow always doubted this, never having had a case of the kind under his notice; but Dr Richardson is in a position to prove it, having had a case, it appeared, in which hysterical sobbing during inhalation entirely prevented the insensibility. After trying for two hours ineffectually to bring the patient under the influence of the chloroform, he had to desist, as the heart was getting irregular. It is possible that in hysteria some alteration takes place in the composition of the blood which prevents the absorption of the chloroform, thereby very much reducing the action of the anæsthetic.

With regard to the best means of administering chloroform in operations on the teeth, he (Dr R.) is of opinion that a sitting position, with the head a little back, is the best. The inhalation in these operations is to be carried to the end of the third degree. Some persons operate during the first or second degrees; but as the greatest danger from chloroform arises in the first and second degrees, it is much the safest plan to push on to the third degree. Sometimes, indeed, in the second degree the mouth is firmly closed, owing to the contraction of muscle. In this case, no attempt to force the mouth open by means of a wedge, or in any other way, should be used, but the administration should be carried on until the third degree arrives; the jaw will then fall of itself. Dr Richardson recommended a very good plan to the notice of the Dentist particularly, as being simple, effective, and admirably adapted for cases of prolonged operations in the mouth, which the French have the merit of having introduced. It consists in having a tube fitted to the inhaler: after the patient is insensible, this tube is passed into one nostril of the patient, thereby causing him to inhale chloroform by one nostril, and air by the other.

A theory has been started by Dr James Arnott (author of congelation), that in addition to the immediate dangers attending the administration of chloroform, there are secondary dangers, and even death three or four days after its administration, owing to shock, or the production of a low febrile state. Now, physiologically, this is not feasible: both Dr Snow and Mr Nunneley agree that chloroform has but one action—that of producing narcotism, and immediate death if carried beyond the proper limits. It cannot possibly produce febrile symptoms; for after it is taken into the system, it undergoes no alteration, but remains as chloroform until it is passed out again; which transition takes place very rapidly, owing to the extreme volatility of the vapour. So far from chloroform causing shock to the system, Dr Richardson argued that it prevented shock instead; and that now, with the aid of chloroform, many very serious operations, such as ovariotomy, amputations of the hip-joint, and others, are frequently and successfully performed; whereas before the introduction of anæsthesia such operations were hardly ever attempted, as the patient seldom recovered from the shock of the operation.

Most of the American Dentists use ether in their operations, and there is no doubt but that it is less dangerous than chloroform—in fact, we have no very clear case of a death having arisen from the administration of ether. Mr Nunn was supposed to have had a patient who died from its effects, but the proofs were faulty. Some persons use the argument, that ether has not been applied a sufficient number of times to thoroughly prove its effects ; but if those persons would only take the trouble to make inquiries, they would find that it has been quite as extensively used as chloroform, though mostly in France and America. The greatest objection to ether lies in the fact that it is less ready, and not so determinate. Amylene would have every advantage of both chloroform and ether, if we could only get it pure. Dutch liquid has been used in about one hundred cases without a death occurring; but it has not been used a sufficient number of times to enable us thoroughly to judge of its qualities. The monochloruretted chloride of ethyle is thought by some to be better than chloroform; but that also has not been used sufficiently for us to arrive at an accurate conclusion.

The deaths that have occurred from chloroform are numerous. There is no denying that there have been at least one hundred and fifty cases of death, while many have occurred without any notice being taken of them. Dr Richardson is aware of five unpublished deaths, and a friend of his of four more. Dr Arnott says that if opium killed as many persons as chloroform, its use would be prohibited by law. The deaths occur either from the immediate effects of the chloroform, or from the too long administration of it; generally from the first of these two causes, the second seldom occurring, unless through carelessness. In one case, a lady administered it to herself during her confinement, and died from excess of inhalation.

There has been much discussion and theory as to the immediate cause of death from chloroform. Some think that it is through spasm of the glottis; some, by asphyxia; others, that it is caused by the tongue dropping back upon the glottis, and the like. The fact is, there has been no precision in the examinations of patients dying from chloroform ; for every one about the patient is alarmed, the galvanic apparatus or artificial respiration is applied, and every one is so anxiously endeavouring to preserve life, and no one is taking minute observations of the precise symptoms of the dying patient : therefore it is impossible to tell with any certainty from the human subject the actual cause of death. All the facts we have, or nearly all, are derived from experiments upon animals. Dr Richardson has performed a number of experiments with various animals, and the conclusion he has come to with regard to the reason of death is that it takes place through paralysis of the heart, the view first advanced by Dr Sibson. He (Dr Richardson) injected some chloroform into the aorta, and so into the coronary arteries of an animal: immediate paralysis of the heart was the result. In one experiment, he removed the heart from the body, and placed it, still beating, on the table. On bringing the vapour of chloroform to bear upon it, the contractions stopped immediately. There is no doubt, indeed, but that chloroform has a direct action on the heart, being brought to it by the blood. At its first introduction into the organ (in the first degree of anæsthesia), the vapour sometimes causes over-excitement of the organ, and death. One fact that goes a great way to prove this theory is, that out of fifty cases of deaths from chloroform recorded by Dr Snow in his work, all with but three exceptions died from cardiac syncope, or other form of heart disease, and all except five died within five minutes. The deaths were nearly all in cases of small operations, eighty per cent. being in teeth extractions: many of the deaths occurred before the operation was attempted.

Some object to the administering of chloroform in tubercular diseases of the lung, such as tubercle; but Dr Snow has administered it with success to a great number of patients afflicted with tubercular disease. Dr Richardson has done the same, and considers that, as a rule, no class of persons take it better: at the same time, he does not dispute that there might be cases where it would not be advisable to administer it. In all cases, the organ we have most to consider is the heart. Dr Richardson here gave a condensed account of the anatomy and physiology of that organ, and the circulation of the blood through it. He then spoke of the pathology of the heart, explaining how there are two kinds of diseases, viz., valvular disease and structural disease. In the first, the valves do not perform their functions properly; the second includes hypertrophy of the heart; thinness or weakness in any portion of the muscular wall; and softening of the heart, as from fatty degeneration. All these diseases may be discovered by auscultation; and it is worthy of notice that it is not the valvular, but the structural disease that is the most dangerous.

In conclusion, Dr Richardson called attention to a few of the leading signs by which we might be able to judge as to whether a patient was in a fit state to receive chloroform. They were as follows:—If we find that the patient is generally feeble, with a pulse whose beat is feeble, depressed, and irregular—or if we find a very plethoric condition of body, we should be chary in attempting to administer the narcotic without first examining the patient by auscultation. If the result of that proves unmistakeably that the patient is suffering from disease of the walls of the heart, we must object to the administration of any anæsthetic.

LECTURE VI.—Tuesday, June 5, 1860.

DEATH FROM ANÆSTHESIA.—POST-MORTEM INDICATIONS.

After a few allusions to the subjects of his last lecture, the Lecturer passed to describe those symptoms which denote a fatal result during the administration of chloroform. These may be divided into two distinct heads, viz., syncope and coma.

Death from coma very seldom takes place: not more than about twelve persons have died from this class of death. The symptoms of coma are apoplectic in their nature. There is very little reason to doubt but that the whole of those persons who have died in the comatose state had pre-existent disease of the kidneys. In disease of either liver or kidneys, we should be especially careful in the administration of chloroform.

In death by syncope under chloroform, the event takes place suddenly, sometimes within the first eight or ten inspirations: in one case, that occurred at St. George's Hospital, the patient is said to have died on taking the first sniff of the chloroform. Dr Richardson is of opinion that in the last-mentioned case the patient did not die from the effects of the chloroform, but from fright. He noticed cases of patients dying on the operating table from fright before they were touched with the knife, long before chloroform was known.

Death in this acute mode generally occurs at about the end of the first degree; and a very curious circumstance connected with it is, that up to the last moment there is no indication of a fatal result. The patient seems to be progressing favourably; there is no difficulty in the breathing, and the very best and purest chloroform may be in use; suddenly there is a call that the pulse has stopped—it has not gradually slacked or fluttered, but it has stopped at once and abruptly under the finger—and if it does not recommence pulsating within from five to ten seconds, there is little chance of saving the patient's life. The cause of this stoppage of the pulse is, of course, owing to paralysis of the heart; but here, again, is a circumstance to be noted—it is the right (or venous) side of the heart that becomes paralysed primarily, and not the left (or arterial). The right side being paralysed, the blood is prevented from passing to the left side of the heart; the left ventricle contracts and expels the blood contained in it through the arterial system, but finding no further blood to contract upon, the arteries come to a full stop, and death is the result: for, according to the law of hydrostatics, a double column of blood (one arterial and one venous) is required in constant circulation for the maintenance of life. After the pulse has stopped, the patient often gives a shudder and is convulsed, (the same convulsive action occurs in animals when bled to death,) and sometimes the respiratory organs make a few efforts to continue their functions; but so sudden is life stopped, that it is as if the great aorta were tied, and the blood prevented from making its circulation. The lips turn of a pallid colour before death takes place.

In the case of a patient showing comatose symptoms, immediately remove the chloroform, and give plenty of fresh air. A stimulant may be administered occasionally, and some recommend a mild emetic if the patient seems inclined to vomit; but the best plan is to leave Nature to herself. Some recommend the holding of ammonia under the nose, but Dr Richardson does not; for though it might produce no harm to hold it to the nose for one minute, yet it would do no good whatever, and we are to remember that ammonia, when inhaled in excess, is an anæsthetic itself.

If there are signs of a patient's dying by syncope, withdraw the chloroform in the first place, give plenty of fresh air, and throw the clothes loose: do not administer ammonia, nor throw water upon the chest; but if the breathing stops, try to start it by means of artificial respiration. Dr Richardson here explained the different methods in use for producing the desired end. The readiest plan is that introduced by Dr Marshall Hall, and has received the name of the "Ready Method." It is effected by laying the patient on his side, and rolling him over on his abdomen, then back again, keeping up a steady alternate motion. But this plan, although answering very well for children, does not do at all well for adults, owing to the strength of the abdominal muscles and the stiffness of the ribs. An adult requires to inhale no less than twenty cubic inches of air at each inspiration to enable him to live; but by this means not more than ten cubic inches can be taken in at once by a dead adult subject.

Mr Reid, of Regent Street, invented an apparatus for artificial respiration. It consisted of two tubes, which were placed one in each nostril, the other ends of these tubes fitting into a piston, with valves so arranged that one tube threw air into the lungs, and the other drew air out, alternately. The inventor used to close his mouth, and be fed with air through the nose, by way of illustrating the effects of his apparatus.

Dr Marcet has also invented a very ingenious instrument, but it is too complicated for general professional use: it might do very well for an hospital. Its principle was somewhat similar to the instrument of Mr Reid.

Dr Richardson has also invented a machine for this purpose, very simple, effective, and powerful. It has the great advantage of portability, as it can be conveniently carried in the coat-pocket. It consists of a double-acting pair of bellows, arranged with valves, so that by working one handle we draw air from the lungs, and by working the other we drive fresh air into its place. By these bellows no less a quantity than thirty cubic inches of air can be administered to or extracted from the lungs by one movement of the handle. (This instrument was passed round for inspection.)

There is a curious incident connected with artificial respiration: it is, that if when an animal is dying we use the bellows a little, so as to keep up the respiration, we keep up life for some little time, but the moment we leave off its use the animal dies. In using the bellows, it is well never to give too much air at each successive stroke, as cases have been known of the air-cells being ruptured through excess of air, administered in this manner. It is of little use keeping up artificial respiration any longer than fifteen minutes.

A plan has been suggested for setting the heart in motion by galvanism. If we apply the galvanic current to a portion of muscle within from one to three hours after death, the muscle will often contract; and if we use an electro-magnetic machine, we can produce a series of contractions. But Aldini, Volta, and all the great Galvanists, admit that the heart does not act like other muscles: indeed, the true rhythmical action of the heart cannot be reproduced by galvanism except directly after death.

There have been many violent discussions as to the action of galvanism, and it still remains a great question whether it communicates a new force entirely, or whether it merely calls up the remains of power that previously existed in the muscle. This point has never yet been decided; but supposing that by the aid of galvanism we could set the heart in true rhythmical action, the great question yet remains to be solved, how is the current to be applied? It has been tried in every way that could be thought of: it has been applied through the medium of the nerves, it has been applied to the pneumo-gastric nerve, and Dr Snow on one occasion pushed two needles through the wall of the chest right into the muscular wall of the heart: but in no one of the numerous experiments that have been made has action of the heart been produced. Dr Richardson has tried numbers of experiments with a like result. In one experiment he killed a dog, and opened the jugular vein, and passed one galvanic wire through it into the heart : on applying the other pole to the chest, he could perceive no action of the organ; he then opened the chest, and applied the wire to the wall of the heart, with no better success; and he is of opinion that galvanism does more harm than good, since he has found by experiment that if he exposed two hearts of different animals, and applied galvanism to the one and let the other alone, the one that he had galvanised always stopped beating before the other one that was not galvanised. We may apply galvanism, but he (Dr R.), speaking with a fair knowledge of its properties, could think of no applicable method of making it useful in exciting contraction of the heart after death.

The post-mortem appearances in the bodies of persons and animals who have died from the administration of anæsthetics were next considered.

After death from chloroform, the lungs, heart, abdominal viscera, and kidneys are sometimes found to be greatly congested, both in inferior animals and in the human subject. Sometimes the brain and spinal cord are also congested ; at others the lungs are of a milk-like whiteness, the veins and the right side of the heart full of blood, and the arteries and left side empty. Dr Richardson has seen the post-mortem effects of narcotics in as many as 2,000 inferior animals ; and in some cases, after chloroform, he has occasionally found that when death took place suddenly there were spots of congestion in the lungs, but no change whatever in them sufficient to account for death. Usually the lungs were bloodless, and there were little evidences of change in the nervous system; the great and only cause of death being paralysis of the heart.

Amylene leaves the same effects as chloroform on the human subject. Ether produces more decided congestion of the lungs and brain.

The Lecturer then proceeded to destroy a rabbit by means of a strong dose of chloroform, and opened the animal to show his auditors practically the post-mortem appearances. The experiment was highly successful, and the theory that death is produced by paralysis of the heart was shown; for while the lungs were free of any congestion, the right side of the heart was gorged with blood, and the left side empty.

Finally, Dr Richardson expressed his regret that the Course of Lectures on Anæsthesia and Anæsthetics had come to an end, and thanked the members for the deep interest and attention they had shown to the subject of the lectures. As this was the first course of lectures that he had delivered upon anæsthesia, and indeed the first course that had been delivered anywhere, he had found some difficulty in arranging his progress from step to step: he had been undecided how to make the beginning, but the plan he had adopted had proved sufficiently practicable for his purpose. He hoped that some of his auditors might be induced to make the subject of anæsthesia a part of their studies. In conclusion, he expressed his best thanks to Mr Lloyd Bullock for his kindness in doing everything in his power to procure specimens for these lectures, and to Mr Vacher (Mr Bullock's assistant) for his very able assistance.

Mr President WAITE then rose, and in a brief but able speech requested the members and gentlemen present to join him in a vote of thanks to Dr Richardson. The vote was carried unanimously, amidst loud and prolonged acclamations.

[In contributing the above Course of Lectures to the pages of the DENTAL REVIEW, I would remark that, as this is a first literary effort, and I have not the facility of writing short-hand, there are necessarily many parts of the Course omitted. But I have endeavoured to give, in a condensed form, the salient points; and as the proof-sheets have been submitted to Dr Richardson, I am enabled to state that all the matter which is reported is substantially correct.—J. D.]

NOTE TO THE BINDER.—The Binder is requested to place the Engravings opposite the following pages, and to substitute the page of Explanation to "Tumours of the Dental Periosteum," given in the present Number, for the one on Tinted Paper in the 'Dental Review' for July.

FORGET'S "DENTAL ANOMALIES."

Plate 1 to face page 18
,, 2 ,, 129
Plate 3 to face page 160.

"TUMOURS OF THE DENTAL PERIOSTEUM."

Plate to face page 512.

TUMOURS OF THE DENTAL PERIOSTEUM.

Explanation of Plate.

Note.—The teeth and the tumours which are attached are represented one-third larger than their natural size.

Figure 1.—Fibrous Tumour developed between the fangs of a first molar on the left side of the lower jaw (1st group, case 1).

Figure 2.—Fibro-plastic Tumour developed on the anterior surface of the fang of a second bicuspid on the right side of the upper jaw (2nd group, case 4).

(*a*) The tumour seen in profile.
(*b*) Embryo-plastic (fibro-plastic) nuclei contained in tumours of this group, magnified 450 diameters.
(*c*) Fibro-plastic fusiform bodies with prolongations belonging to the same tumours, magnified 450 diameters.

Figure 3.—Epithelial Tumour developed on the roots of the second lower molar on the left side (3rd group, case 12).

(*a*) The tumour and the tooth to which it was attached.
(*b*) Epithelial elements (*cells nuclei*) contained in this class of tumours, magnified 450 diameters.

Figure 4.—Myeloplaxic Tumour developed between the roots of the first upper molar on the right side (4th group, case 17).

(*a*) The tumour and the tooth to which it was attached.
(*b*) Myeloplaxic cells from the tumour, magnified 500 diameters.

Figure 5.—Tumour with Cytoblastions developed on the external surface of the inner root of the first upper molar of the right side (5th group, case 18).

(*a*) The tumour and the tooth to which it is attached.
(*b*) Cytoblastions (*cells nuclei*) forming the tissue of the tumour, magnified 500 diameters.

Figure 6.—Tumour of the Dental Pulp developed in carious cavity of the first lower molar on the left side.

Figure 7.—Polyp of the Dental Periosteum contained in the interior of carious cavity, which it completely fills, first upper molar on the right side.

Figure 7 *bis*.—The same Tumour seen in profile and suspended by its pedicle out of the carious cavity.

Figure 8.—Purulent Cyst filled with Cholesterine and developed at the extremity of the root of the left upper canine.

(*a*) The root terminated by the cyst.
(*b*) Crystals of cholesterine contained in the cyst, magnified 300 diameters.

FIG. 1.

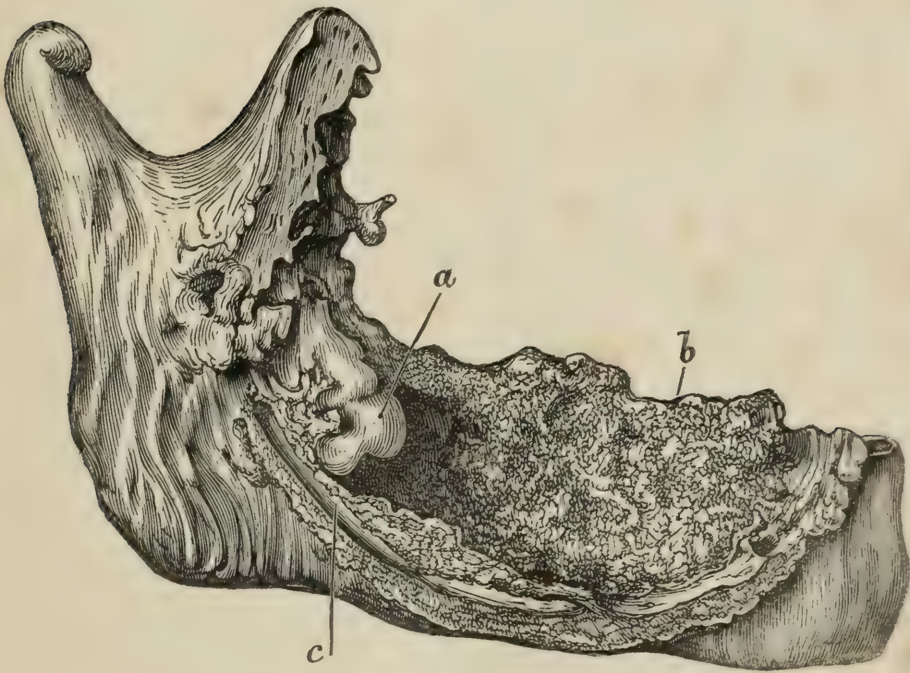
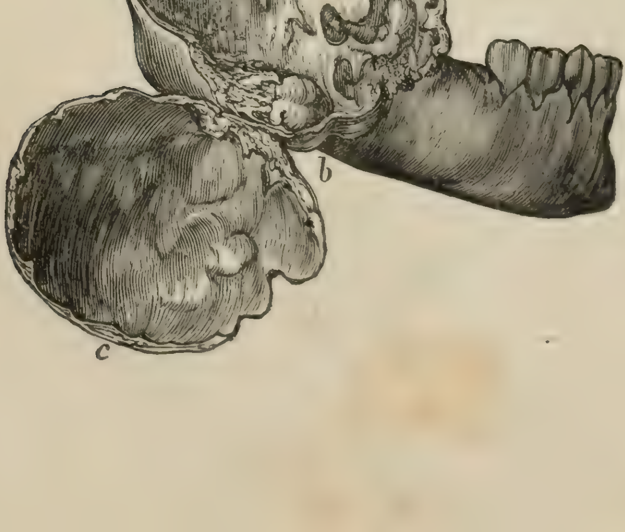


FIG. 2.



THE

DENTAL REVIEW.

FEBRUARY, 1862.

THE NATURAL HISTORY OF THE HUMAN TEETH.

BY JOHN HUNTER, F.R.S.

EDITED BY

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Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 9.)

There is a greater difference between these Grinders in the Upper and Lower-Jaw, than any of the other Teeth. In the Upper-Jaw they are rather rhomboidal, than square in their body, with one sharp angle turned forwards and outwards, the

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Order *Quadrumana*. In the genus *Cheiromys*, which manifests a distinct analogy to the Rodent order in the configuration of the incisors there are four teeth in the molar series on each side above, and three below; they are implanted vertically, and in parallel lines. The molars are simple in structure, coated with enamel, and they have a flat, subelliptic, grinding surface. In the upper jaw, the first is the smallest, and the second the largest, in the series. The first and last have each one root, the second and third each three roots. In the lower jaw, the inequality in size is less than in the upper, but the third is the smallest. The first lower molar has two roots, the second and third have each one. The molar series in the genera *Stenops* and *Lemur* consists of six teeth on each side in both jaws. The three anterior are premolars. In the true Lemurs, the premolars have the outer part of the crown produced into a pointed lobe; the inner forms a tubercle, which is largest in the second and third. The true molars have the inner division of the crown so increased as to give it a quadrate form; the outer division is divided into two pointed lobes. The first true molar is the largest, above and below. The Monkeys of the New World (*Platyrhynœ*) manifest their affinity to the Lemurs in the number of the premolars, which is three on each side of both jaws. The small Marmozets have the true molar series on each side, above and below, reduced to two.

The Catarhine Quadrumana of the Old World have the same number of premolars and molars as Man. We shall again best illustrate the peculiarities of the Human molar dentition, by comparing it with the other backwards and inwards; besides they have three fangs, which diverge, and terminate each in a point; these are almost

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grinding series in the highest Apes. The characteristics of the Human premolars have been already described (p. 532, notes *k* and *l*). If we contrast with the human premolars the same teeth in the genus *Troglodytes*, we notice that, in the upper jaw, the premolars of the Gorilla (see Plate 1) and Chimpanzee are bicuspid, as in Man; but they are larger than the human, and they differ in several other important particulars. The external cusp of the first premolar, in both species of *Troglodytes*, is larger than the inner; in the second premolar, the inner is larger than the outer; in Man, the external is the larger in both. This alternation in the size of the cusps of the premolars of the Chimpanzees corresponds with, and contributes to, the straight line formed by the whole grinding series; whilst the great size of the external cusp gives to the first premolar, when viewed from without, the appearance of being greatly superior in size to the second. Each premolar in *Troglodytes* is implanted, like the true molars, by three divergent fangs, two external and one internal, which at their ends curve towards each other. Professor Owen states that, in one female skull of *Tr. niger* which he examined, the two external fangs of the second premolar are connate; and, in a specimen in the Museum of the Great Northern Hospital, which has fallen under the Editor's observation, a similar peculiarity is to be noticed; in these cases, the first premolar presented the usual implantation by three fangs. In the lower jaw in these great Apes, the first premolar, when viewed externally, appears much larger than the second; in the Chimpanzee it is twice the size, in the Gorilla three times the size, of the same tooth in Man. Its crown is somewhat of a three-sided figure, the anterior and outer angle being produced forwards, and making an approach in this respect to the peculiar characteristic of the first premolar in the Baboons. It is surmounted by two trihedral cusps: of these, the outer is the larger and higher, whilst the inner is feebly developed on a ridge extending transversely from the outer cusp. A thick basal ridge belts the inner and posterior part of the crown. The second lower premolar is of a four-sided figure. Its two cusps are placed on the anterior half of the upper surface of the crown; they are united by a transverse ridge, and a third smaller cusp is developed on the inner and posterior angle. Each lower premolar is implanted by an anterior and posterior fang: of these, the former is the larger. They are divergent, and compressed antero-posteriorly. In the Orangs (*Pithecus*), we recognise the same complex implantation of the premolars, by three fangs in the upper, and by two in the lower jaw. The first premolar in the upper jaw differs from the same tooth in the Gorilla and the Chimpanzee, in having the anterior external angle of the base produced, an approximation to the configuration observed in the lower Quadrumana. The outer lobe of this tooth is a little larger than the inner one; in the second upper premolar, both lobes are equal. The two cusps of the first are also more developed than the two cusps of the second. In the lower jaw, the outer cusp of the first premolar attains by far the greater dimensions; from it three ridges proceed—one to the front part of the grinding surface, one to the back part, and a third transversely inwards, where it developes a small tubercle. In the second lower premolar, the inner tubercle attains almost an equal round, and have but one cavity. Two of them are placed near each other perpendicularly, over the outside of the Tooth; and

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size with the outer. Amongst the distinguishing features of the true molar teeth in Man, are their large size in proportion to the jaw, and in proportion to the other teeth, and the rounded contour of their grinding surfaces. In the upper jaw, the two first teeth of the molar series are quadricuspid. Of the four cusps, the antero-internal one is the largest; and it is connected with the postero-external by a low ridge, on either side of which is a deep groove, extending on the outer side to the middle of the outer surface, on the inner side to the inner surface. The connection of the inner anterior and the outer posterior cusps by the oblique ridge just mentioned, gives a sigmoid character to the eminences on the grinding surfaces of these teeth. In the last true molar, which is the smallest of the series, the two inner tubercles are blended together; and, in many instances, a groove extends at right angles from the one separating the two outer cusps to the middle of the posterior border of the grinding surface. The upper molars in Man are implanted by three diverging fangs, two external and one internal; but not unfrequently, in the second molar, the two external are found parallel, and occasionally connate. In the third upper molar, the two external fangs are more commonly connate, and sometimes, also, the inner fang is blended with them. Owing to the slow accession of maturity in Man, and the long interval which elapses between the acquirement of the first and last true molars, the former tooth is found more worn in proportion to the other teeth of the same series, than in the Chimpanzees and Orangs. In the lower jaw, the human molar is quinque-cuspid, the fifth tubercle being developed posteriorly, and connected with the postero-external cusp. The fifth cusp is, however, frequently absent in the second tooth of the series, and is most developed in the *dens sapientiæ*. A crucial depression separates and defines the four principal cusps, and, by a bifurcation of its posterior branch, includes the fifth. This bifurcation is most apparent in the third molar. As in the upper jaw, the last named tooth is the smallest of the true grinders. Each molar is implanted by an anterior and a posterior sub-compressed fang, which are grooved along their opposed side. It is not uncommon to find these fangs more or less connate in the second and third teeth of the series. On turning to the genus *Troglodytes*, the first thing which attracts notice is the straight line which the grinding series forms in the Chimpanzee and Gorilla, contrasting strongly with the well-marked curve which the molar teeth describe in the human subject. In the upper jaw, indeed, in these great Apes, the line of grinders makes a slight inclination in the opposite direction to that described by them in Man. Another difference is the smaller relative size of the grinders as compared with the incisors. In this last particular, the Gorilla makes a nearer approach to Man than the Chimpanzee; for in the former the molars are larger relatively, when compared with the incisors, than in *Tr. niger*. In the upper jaw, the first two molars, both in *Tr. Gorilla* and *Tr. niger*, correspond with the same teeth in the human subject, in being quadricuspid, and in having the inner anterior and outer posterior tubercles connected by a low ridge. The sigmoid character thus given to the eminences on the unworn surfaces of these teeth, is highly indicative of the high position in relation to Man occupied by the Chimpanzees above the Orangs and the other, which generally is the largest, stands at a greater distance on the inside of the Tooth, slanting inwards. In this

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lower Quadrumana, in whom the grinding cusps rise from the surface of the tooth distinct and unconnected. The third upper molar in *Tr. niger* is the smallest of the series, in consequence of the minor development of the two posterior cusps ; also, the oblique connecting ridge between the antero-internal and postero-external cusp is either absent or feebly developed. In the Gorilla, the last upper molar differs from the same tooth both in the Chimpanzee and in Man, in its greater size, being equal to the second except at the posterior part, which is slightly narrower, and in having both the posterior cusps, but especially the inner one, much more distinctly marked. The connecting ridge between the anterior internal and outer hind cusp is also present, but it is more transverse than the same ridge in the other molars. Each upper molar in both species of Troglodytes is implanted, as in Man, by one internal and two external fangs. These have not been observed connate in any of the Anthropoid Apes. In the lower jaw, the three molar teeth of the Gorilla are equal in size ; in the Chimpanzee they are nearly equal, the first being only slightly larger than the last. In both species, the four principal cusps, and especially the two inner ones, are more pointed and prolonged than in Man ; but the fifth posterior cusp is proportionably smaller. The fifth cusp is present in the second tooth ; it is usually absent in the second molar of Man. The crucial depression which separates the cusps is much less distinctly marked, and does not divide the ridge connecting the anterior pair, as in the human lower molar. Owing to the great development of the fifth posterior cusp, the crown of the last molar is of longer antero-posterior measurement. The implantation of these teeth resembles that in the human subject, except in the fact that the two roots of the second and third are never found connate in the Gorilla and Chimpanzee. The true molars in the Orangs (*Pithecus*) differ from the true molars of the Chimpanzees in their smaller relative size as compared with the premolars. Like the molar series in *Troglodytes*, they form a straight line in both jaws ; and they have a similar implantation, by three roots in the upper and two in the lower jaw. In the superior series, the first and second teeth are furnished with four cusps ; but they are less developed, and the depressions between them are shallower ; the connecting ridge between the antero-internal and the postero-external tubercles is either absent, or but very feebly developed, so that, as before stated, the sigmoid character of the elevated surface is not marked, as in Troglodytes ; the whole grinding surface is flatter, and minutely wrinkled. In the lower jaw, the first and second molars have three cusps along the outer side, and two on the inner. The last tooth of the series has two external cusps distinctly marked, but the postero-internal tubercle is but feebly developed. The unworn surfaces of the lower molars are, like those of the upper, minutely wrinkled. Lastly, it would appear that, in the Orangs, it is not very unusual to find a fourth supernumerary molar, sometimes in the upper, sometimes in the lower jaw, on one or both sides. It is worthy of remark, that supernumerary teeth occurring in the human subject are generally incisors or canines.

The molar series in the true Carnivora presents a peculiar type. Its number varies in different genera, and the typical characters are most

Jaw these two Grinders are inclined outwards, and a little forwards; they project a little over the corresponding Teeth of

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strongly marked in those which exhibit most strongly carnivorous propensities. The formula in the *Felidœ* is $p.\ \frac{3}{2} \colon \frac{3}{2} \colon\ m.\ \frac{1}{1} \colon \frac{1}{1} \colon$. In the upper jaw, the first premolar (*p.* 2) is small and rudimentary; the second (*p.* 3) is much larger, implanted by two fangs, with a trenchant, conical crown, having its cutting edge slightly notched, indicating a division into three lobes, with a posterior basal ridge; the third (*p.* 4) is the upper "*dent carnassière*" of Cuvier—the scissor, or sectorial tooth. It is a large tooth, implanted by two fangs. The crown consists of a trenchant portion (the blade) which is divided into three lobes, of which the anterior is the smallest, the middle the longest and most pointed, and the posterior largest. On the inner side of the base of the anterior third of the crown, a thick tubercle is developed, which projects inwards. The two posterior thirds of the inner surface of the crown are smooth, and against this smooth portion works the outer surface of the blade of the lower carnassière. The fourth tooth (*m.* 1) is small and rudimentary. It is implanted behind and on the inner side of the carnassière. In the lower jaw, the premolar series is reduced to two by the absence of *p.* 2. Of the two premolars, the anterior is the smaller. They have both compressed, trenchant, conical crowns, divided by slight indentations in the cutting edge into three lobes, of which the middle is the largest. The second (*p.* 4) has a posterior basal ridge. The third tooth is the lower carnassière—the first molar. It is implanted by two fangs, and its crown is nearly equally divided into two trenchant lobes. It is to be remembered that the upper carnassière in the Carnivora always succeeds a deciduous tuberculate molar—it is, therefore, essentially a premolar; whilst the lower carnassière is developed behind the deciduous series—it is, therefore, the first true molar. The upper carnassière is always a little anterior to the lower. In the Hyænas, the molar formula is $p.\ \frac{4\,4}{3\,3}\ m.\ \frac{1\,1}{1\,1}$. The teeth of the molar series in both jaws are larger and stronger than in the *Felidœ*, and an additional premolar tooth, *p.* 1 in the upper, *p.* 2 in the lower jaw, is retained. As in the *Felidœ*, the upper true molars are rudimentary. The premolars are remarkable for the strong basal ridges they present, which serve to protect the gums in the rough work of crushing and breaking up bones. The first upper premolar is very small and conical, the second is much larger, and the third still larger, and of great strength. The strong cones of the second and third are each belted by a posterior and internal basal ridge, and the posterior part of the cone is also traversed by a longitudinal ridge. The fourth is the carnassière, and presents a blade divided into three lobes, and a strong internal trihedral tubercle. In the lower jaw, the first premolar (*p.* 2) fits into the interspace between the first and second premolars above. It presents a ridge anteriorly, and a broad basal talon behind. The second (*p.* 3) is the largest; it has an anterior and a posterior basal ridge, and its strong, rounded cone presents also an anterior and posterior vertical ridge. In the third (*p.* 4), the posterior basal ridge is developed into a small cone. The lower carnassière of the Hyæna resembles that of the *Felidœ*, except that the points of the two lobes are less produced, and from a small posterior talon a ridge is continued along the inner side of the base. In the family of the *Viverridœ* (Civets, Genets, Ichneumons, &c.), the molar series is $p.\ \frac{4\,4}{4\,4}\ m.\ \frac{2\,2}{2\,2}$. This the Lower-Jaw, and they are placed further back in the mouth, so that each is partly opposed to two of the Lower-Jaw. The

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increase in the number of these teeth forms a link between the genus *Canis* and the genera already referred to. The sectorial teeth are more tubercular than trenchant. In some aquatic species, however, as in the sub-genus *Cynogale*, the premolars have compressed, triangular, trenchant, sharp-pointed crowns, the edges of which are minutely serrated, like the teeth of certain sharks. In the Indian Musangs (*Paradoxuri*), which are but little carnivorous in their habits, subsisting principally on the fruit of the palm-tree, these teeth manifest the opposite or tuberculate character. The lower sectorial (*m.* 1) has a pointed lobe developed on the inner side of its two anterior lobes; its posterior lobe is trituberculate, as in the dog. The crown of the last lower molar (*m.* 2) is oval, with four small tubercles, resembling *m.* 2 in the Dog. The molar formula in the genus *Canis* is $p.\ \frac{4}{4}:\quad m.\ \frac{2}{3}:\frac{2}{3}:$. The premolars have strong, sub-compressed conical crowns; they increase in size from before backwards, the larger ones presenting one or two small posterior tubercles. The upper sectorial (*p.* 4) is of much larger size than the other teeth of the series. It is divided by a wide notch into two lobes, of which the anterior is much the larger and more produced; from the inner side of its base the tubercle is developed. The upper true molars are tuberculate; the second is very small. The lower sectorial (*m.* 1) has the blade formed by two conical lobes, of which the posterior is the larger; behind this the base of the crown extends into a broad quadrate trituberculate talon. The second molar presents two anterior opposite cusps, and a broad posterior talon. The third molar is very small. Professor Owen remarks—"The succession of two tubercular teeth behind the permanent sectorial tooth in the adult, or permanent dentition of the lower jaw, carries the genus *Canis* farther from the type of its order, and stamps it with its own proper omnivorous character, and this contributes to adapt the Dog to a greater variety of climates and food, and of other circumstances, all of which tend, in an important degree, to fit that animal for the performance of its valuable services to Man." In the Weasel tribe (*Mustelidœ*) there are usually three premolars in the upper jaw on each side; the Otter, however, has four. In the lower jaw on each side there are four or three premolars. The true molars are usually $\frac{1}{2}:\frac{1}{2}:$. In the Otter the sectorial and molar teeth present increased grinding surfaces, in relation to the coarser nature of their animal diet, and the necessity of crushing the bones of fish before they are swallowed. In the great Sea-Otter (*Enhydra*) the upper sectorial (*p.* 4) is remarkably modified; the two lobes of the blade are hemispheric tubercles. The last tooth (*m.* 1) is larger than the sectorial, and has a similar broad crushing form. The crown of the lower sectorial (*m.* 1) presents many gradations in this genus from the cutting form observed in the Weasel and Glutton, to the crushing type of the Ratel and Sea-Otter. In the American Skunk, the second upper premolar is absent. The molar series, $p.\ \frac{3\,3}{4\,4}$, $m.\ \frac{1\,1}{2\,2}$, in the subfamily of Badgers (*Melidœ*) contrasts in its tuberculate and omnivorous character with the sectorial type found in the predaceous Weasel. The upper true molar in the European Badger attains an enormous size as compared with that of the same tooth in any of the preceding Carnivora; it presents three external tubercles, and an extensive horizontal surface traversed by a second in the Upper-Jaw is smaller than the others, and the first and second are placed directly under the Maxillary Sinus. I once saw the second Grinder naturally wanting on one side of the Lower-Jaw.

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low ridge, and bounded by an internal belt. The molar series in the Bears (*Ursidœ*) is *p.* $\frac{4\,4}{4\,4}$, *m.* $\frac{2\,2}{3\,3}$; but the number of premolars presents some variation in different species. The true molars in both jaws present a tuberculate grinding surface. The teeth which correspond with the true molars in the Seals (*Phocidœ*) are more numerous than in the digitigrade family of Carnivores ; in the upper jaw, they occasionally rise to the typical number of three on each side. The entire molar series in the Seals is usually five or six teeth on either side of the upper jaw, and five on each side of the lower. In some genera—as the Eared Seals (*Otariœ*), and Elephant Seals (*Cystophora*), they are each supported by a single fang, in other genera by two fangs, which are usually connate in the first and second teeth. The fangs of all the teeth in the Seals are of remarkable thickness. The crowns of the molars are generally compressed, conical, and pointed ; they present the 'cingulum,' and anterior and posterior basal tubercles more or less developed. In a few, however, of the larger species the molars are simple and obtuse. This is especially the case in the Walrus, in which the molar series is reduced to a smaller number than in the true Seals, being, in the adult, three on each side in the upper jaw, and four in the lower. On turning to the extinct Carnivora, we find in *Machairodus* two premolars, *p.* 3 and *p.* 4, and one small rudimentary tubercular molar in the upper jaw ; in the lower the molar series accords with that of *Felis*. The more ancient carnivorous forms of the older tertiary formations exhibit the typical formula of Placental Diphyodont dentition. In *Hyœnodon* each of the three lower molars present the carnassial form as truly as the lower carnassière of the Felidœ. In another early carnivore (*Amphicyon*), with the same typical number of teeth, the molars have the tubercular conformation—the prototypes of the tubercular molars of the *Viverridœ* and *Canidœ*.

(To be continued.)

ORIGINAL COMMUNICATIONS.

DISEASES OF THE DENTAL PERIOSTEUM:

A Course of Lectures delivered at the College of Dentists of England, Session 1860-61.

By R. T. Hulme, M.R.C.S., F.L.S.

Lecture III.

(Concluded from page 543, vol. iii.)

A tumour occasionally arises from that portion of the dental periosteum attached to the neck of the tooth, and is, therefore, situated externally to the alveolar cavity. This form of tumour invariably occurs in teeth in which the crown is in a great measure destroyed by caries. As the tumour enlarges, it becomes attached by a narrow pedicle to the periosteum, and is lodged in the cavity of the crown, where it is liable to be mistaken for a fungous growth of the pulp itself. M. Magitot* terms such a formation polypus of the dental periosteum, and expresses his surprise at not finding it described by any author. The latter statement is not altogether correct, as is shown by the following passage from Harris :—It often happens that a fungous growth of the gum or dental periosteum, finding its way through an opening in the side of the neck or root of a decayed tooth, appears in the central cavity, and this is sometimes mistaken for a morbid growth of the pulp. † The vascular tumour described by Salter would appear to have been a growth of this kind.

A polypus of the dental periosteum may be readily distinguished from a diseased pulp, by simply raising it up with a probe, when it will fall out of the tooth cavity in which it is lodged, and show that it is in reality connected with the periosteum at the neck of the tooth. These formations are almost invariably attached to one of the bicuspid or molar teeth. They give rise to the same pain and inconvenience in eating that occurs from a tumour of the pulp; they are liable to bleed freely when pressed upon, and often produce sharp attacks of pain.

The treatment of dental polypus should depend upon the condition of the tooth in other respects. These polypi, like the tumours of the pulp, says M. Magitot, appear to be capable of being permanently cured. The treatment consists of cutting off the tumour at its pedicle. The polypus then falls into the mouth, and in order to guard against its return, the remains of the pedicle should be destroyed by cauterisation; the caries must then be stopped either immediately or after the necessary preliminary treatment.

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* *Opus. cit.*, p. 58.

† *Opus cit.*, p. 477.

The bones, like other parts of the body, may take on a general increase in size, and the bone is then said to be hypertrophied or over-nourished. Such a change sometimes occurs in one of the long bones, but it never happens in the tooth. At other times the excessive growth is limited to a portion of the bone; the hypertrophy is irregular; the new growth forms a hard, irregular projection from the surface of the bone; it is to such growths that the term exostosis is applied, and this form of hypertrophy may take place in the tooth. These morbid growths are, however, limited to the surface of the fang—in fact, to that portion of the tooth which is invested by the periosteum. Dental exostosis may present itself under three forms; 1st, it may be confined to the extremity of the fang or its immediate vicinity, and this is what occurs most frequently; 2nd, it may extend over the whole surface of the fang, and put on more the appearance of general hypertrophy; and, 3rd, and lastly, it may occur in the form of small nodules projecting from a limited portion of the fang, and therefore bearing a closer resemblance to the exostosis which occurs on the other bones. It is the form which is least frequently met with.

The changes which accompany the formation of the osseous matter are not so easily traced in the fang of the tooth as they are in some of the long bones. In the first instance, these bones are formed through the medium of a cartilaginous matrix. This cartilage contains a number of cells which, at the period when ossification is about to take place, increase in size, and new generations of cells become developed from those which previously existed. At the part where ossification is proceeding, the cells arrange themselves in longitudinal rows; calcareous matter is deposited in the matrix around the cells, and the primitive cartilage is converted into bone. The external membrane which covers the cartilage subsequently forms the periosteum of the bone. This periosteum may itself give rise to a further formation of osseous matter on the external surface of the bone, a process which is thus described by Kölliker:—"The periosteum of the bones which commence by cartilage is relatively very thick and vascular, and, even in the fifth month of fœtal life, consist of ordinary connective tissue and fine elastic fibres; the latter, as the development advances, becoming thicker and thicker, and occasionally assuming the nature of thick elastic fibres. Upon the inner side of the fully-developed periosteum there is an ossifying blastema firmly adherent to the bone, so that when the periosteum is pulled off it generally remains lying upon it in the form of a moderately thick, soft, whitish-yellow lamella, which, when examined microscopically, presents a fibrous tissue with somewhat indistinct fibrils, like immature connective tissue, and granular, oval, or round nucleated cells. If this lamella be raised from the bone, it is found to be very intimately connected with the most superficial layers of the latter, and upon its inner side detached osseous fragments and portions of reddish, soft, marrow, from the most superficial bone spaces, are usually met with. The denuded bones, when the lamella has been cautiously and successfully detached, has a rough, and, as it were, porous surface, with numerous medullary spaces, and, in its outermost part, is, for a greater or less extent, quite soft, pale, yellow, and translucent; further inwards, on the contrary, it continually increases in firmness and whiteness, till at last it assumes the usual appearance of fully-developed bone. The formation of bone which undoubtedly here takes place, is effected through means of the above-mentioned blastema, the cells of which, scattered among the delicate fibres, have not the slightest resemblance to cartilage cells, but have exactly the same appearance as fœtal marrow cells, or the formative cells of the embryo; in fact, it is now not very difficult to demonstrate that the outermost still soft osseous layers, with their trabeculæ and projections, pass into the blastema in question, and that first the fundamental substance of the bone arises from its fibrous tissue by the simple uniform deposition of calcareous salts, but, as it would seem, without the previous appearance of calcareous granules; and, 2nd, that the bone-cells become developed from the formative cells of the blastema. These cells gradually assume a stillate form, and when the surrounding matrix ossifies, become directly transformed into stellate bone-cells."

I have already referred to the three forms which dental exostosis assumes. Most teeth, as the person advances in years, obtain a certain increase in the thickness of the cement at the extremities of the fang, but this increase in healthy teeth is usually so slight, that it can scarcely be regarded as a state of disease. It is, indeed, very difficult to draw the line between what may be regarded as a normal amount of increase, and that which constitutes disease, especially as these growths may continue for a long time, and assume very considerable dimensions without producing any inconvenience. The ill-effects probably depend rather upon the rate of increase than its actual amount. We have previously seen how readily the socket of the tooth becomes absorbed if pus is present; the same thing takes place when a deposit of bone is formed around the fang of the tooth. Exostosis occurs most frequently in teeth which have been attacked by caries, or in old stumps that have long been subject to chronic inflammation.

There are, however, many exceptions; out of four specimens of which I have sections, the two most marked belonged to teeth which were not decayed. A third is the remains of an upper molar, in which the crown was nearly destroyed by caries. This specimen is remarkable for the extent to which the new growth has extended up the sides of the fangs, reaching almost to the neck of the tooth. In the fourth specimen, which is a transverse section, the osseous deposit has been very regularly and uniformly added upon the stumps of a lower molar tooth.

If a tooth in which the formation of exostosis is going on, is examined immediately after extraction, the periosteum is found considerably thickened and somewhat vascular; it is soft and flocculent on its outer surface, while its inner adheres very firmly to the tooth. Examined beneath the microscope, the outer portion is seen to consist of a thickish glairy fluid, with cells floating in it. In its middle portion, the periosteum contains an amorphous, granular basis, interspersed with delicate, undulating fibres and fibro-plastic elements. In addition to these structures, there are a large number of nucleated cells, corresponding to the osteoplasts or cartilage cells of growing bone ; it is from these cells that the cement cells or bone corpuscles become developed. The innermost portion of the periosteum is firmly adherent to the fang of the tooth, and gradually assumes the character of the fully-developed tissue, so that portions of osseous matter may be found extending from the fang of the tooth into the substance of the thickened periosteum. In exostosis, the bone cells, with their radiating canaliculi, are more numerous and more fully-developed than in the normal cemental layer of the healthy tooth ; they are arranged somewhat parallel to the outer surface of the fang, and undulating lines may be perceived, having a similar arrangement, indicating the successive additions of cement to the fang of the tooth. Another peculiarity of these hypertrophied conditions of the cement, is the more frequent presence of Haversian canals in the newly-formed tissue. Sometimes the bone cells appear as if arranged around the Haversian canal, but never so distinctly and so regularly as in the ordinary bones of the body. In one specimen for which I am indebted to the kindness of my friend Mr Henry, the blood is still retained in that portion of the Haversian canal which is contained in the section. Exostosis may occur in apparently sound teeth, as well as in teeth attacked by caries. The symptoms attending this disease are exceedingly obscure ; indeed, as has been already remarked, the transition from a state of simple increase to one of disease is not easily determined. Exostosis may, therefore, be present without giving rise to any symptoms. At other times, there are pains about the head and face, and sometimes the patient will fix upon a particular tooth as the source of his suffering. At first, such an indication will be often very uncertain ; but after a time it may become more pronounced, and the Dentist will feel justified in removing the tooth. Striking the diseased tooth sharply with the handle of an instrument will sometimes produce a paroxysm of pain, and thus assist in diagnosing the precise tooth which is the source of the patients suffering. When the tooth is affected by caries also, there may be sponginess of the gum, separation from the neck of the tooth, and a slight purulent discharge ; a case of this kind would present little difficulty, as no one would think of leaving such a tooth in the mouth of a patient suffering from facial neuralgia, unless the caries could be stopped, and the discharge arrested. When the tooth is apparently sound, it will be advisable to try the effects of general remedies before resorting to extraction, which is the only resource in exostosis. The increased growth of the cementum will occasionally give rise to frightful suffering, simulating all the characters of facial neuralgia, and sometimes it appears even to excite disorders dangerous to life.

Sir H. Halford* has related a well-marked case of tic doloureux, arising from dental exostosis. The lady had suffered violent tic doloureux, till an apparently sound tooth was extracted on account of the attacks being frequently preceded by uneasiness in it; an exostosis was found at its root.

One of the most extraordinary cases of dental exostosis on record, is related by Mr Fox.

The patient was a young lady twenty years of age; for more than a year she had suffered from deep-seated pain in the face, and in the teeth and gums. The pain gradually extended to all the teeth, and one by one all those of the lower jaw, with the exception of the four incisors, were removed. During this time every kind of Medical treatment had been resorted to, but without affording any alleviation to her sufferings. At the time the patient consulted Mr Fox, she was only able to take fluid nutriment, for the teeth of the upper jaw were so tender that the slightest touch caused extreme pain; there was a constant flow of saliva from the mouth, and the palpebræ of one eye had been closed for nearly two months, and when opened the sight of the eye was affected. For some time the lady was under the care of Dr Babington and Mr Cline, but without obtaining any relief.

The most painful tooth was first extracted. This was the first molar of the upper jaw situated under the eye, the pulpebræ of which had become closed. The fangs of the tooth were much enlarged; its removal was attended with great benefit, and two days after the affected eye could be opened. This only afforded partial relief, and eventually all the teeth were removed, when the patient was at length relieved from her sufferings.

Mr Tomes† mentions the case of a lady who had suffered from tic doloureux for some years. The crowns of the teeth were sound; but when extracted, the fangs were found to be enlarged from exostosis. The disease was not cured until the whole of the teeth in the upper jaw had been removed.

The same writer has recorded the following case of general derangement of the nervous system arising from diseased and exostosed teeth which occurred in the Middlesex Hospital :—

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* *Lond. Med. and Phys. Journ.*, March 1823, p. 199.

† *A System of Dental Surgery.* By John Tomes, F.R.S., p. 441. London, 1859.

"A lad, a farm-labourer from Windsor, was admitted into the hospital for epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined, and the molar teeth of the lower jaw were found to be much decayed, and of some of these the fangs only remained. He did not complain of pain in the diseased teeth or in the jaw. The decayed teeth were, however, removed, and the fangs of each were found to be enlarged and bulbous from exostosis. During the eighteen months that succeeded the removal of the diseased teeth, he had not suffered from a single fit, though for many weeks previous to the operation he had two or three per day. This is a case of singular interest, inasmuch as there was no complication of maladies, and hence there could be no doubt as to the cause of the disease, seeing that it immediately subsided when the teeth were removed." *

I have already referred to the usual forms under which exostosis occurs on the fangs of the teeth, and the dimensions which these morbid growths usually assume. The disease most frequently attacks the bicuspid and molar teeth, and occasionally assumes very extraordinary dimensions. I have before me a specimen of a lower bicuspid in which a mass of cementum is attached to the extremity of the fang of the size of a large pea. In the College of Surgeons the specimen numbered 1,022, is catalogued as a case of exostosis,and is referred to by Mr Tomes as the largest example which had come under his notice. I believe, however, upon a careful examination, this specimen will be found to consist of the wisdom-tooth embedded in and united to the distal surface of the second molar.

The most remarkable example of dental exostosis with which I am acquainted is one recorded by Dr. Forget.*

A man, aged sixty, came to Paris for the purpose of having a tumour removed from the interior of his mouth, which had caused him great suffering and inconvenience. The tumour occupied the left side of the lower jaw, causing both of its surfaces to project, but especially the outer, and thereby unpleasantly distorting the countenance. At the small extremity of the tumour was a decayed tooth, the crown of which was completely destroyed, and in a great measure concealed by the protection of the gum. Before operating on the tumour, M. Maisonneuve determined to extract the decayed tooth, thinking it would facilitate the examination and removal of the encysted mass. The preliminary operation had an unexpected and definite result, for the tooth and the tumour which was attached to were both removed at the same time.

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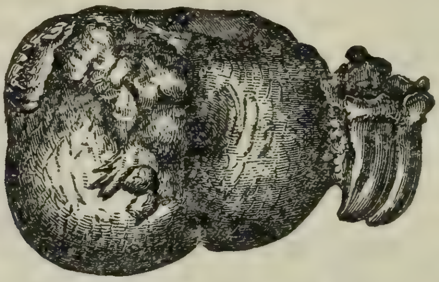
* *Opus cit.*, p. 443.

* *Des Anomolies Dentaires* Par. Am. Forget, Paris, 1859. See also DENTAL REVIEW, vol. ii, p. 61.



The tumour, which was larger than a pigeon's egg, was attached to the tooth by a kind of narrow pedicle; a section made in its length showed a line of separation between it and the root of the tooth. Under the microscope, the specimen was seen to contain no dentine, but to consist exclusively of osseous tissue. The patient speedily recovered; the walls of the alveoli, which had been separated by the tumour, became absorbed, a slight inflammation spread over the internal surface of the cyst, and the latter gradually contracted and closed up.

The increase of the cementum rarely involves any other structure than the fang of the tooth, and the socket is gradually absorbed in order to make way for the new growth. Union of the tooth with the socket is an extremely rare occurrence, if, indeed, a true osseous junction ever does take place. I have previously referred to this circumstance in my first lecture, and have adduced it as an argument in favour of the existence of a distinct periosteum lining the interior of the alveoli. It is, therefore, wrong to speak of the alveolo-dental periosteum, thereby implying that there is only one membrane common to the tooth and its socket.

The abnormal growth of the cementum occasionally produces the entire absorption of the septum between two contiguous teeth. When this happens the teeth may become joined together by means of the newly-formed cement. I have in my possession an admirable specimen, for which I am indebted to my friend, Mr Tibbs, of Cheltenham, in which the second and third molar teeth of the right side of the lower jaw are united together.

Dr Chapin Harris has given several examples of union between two teeth, and mentions one specimen in his possession where three teeth had become united. This union of the teeth, as the result of exostosis, is always, as far as I am aware, confined to the molar teeth.

Mr Salter, in one of his valuable contributions to dental pathology, has described a particular form of exostosis which he has termed "Cancellated or Vascular Exostosis," and of which he gives the following description:—The tooth was a superior bicuspid; the crown and upper part of the fang were normal in form, but the lateral surface of the former exhibited caries. On the lower half of the fang there was considerable incrustation of hypertrophied tooth-bone covering the lower half. The exostosis exhibited an unusual appearance. Instead of the smooth, dense structure and unbroken, or, at most, undulating surface of the mass, usual in dental exostosis, the specimen displayed a loose, porous, friable exterior, opaque and dead-white. On viewing the cut surface of the fang of the tooth, the *crusta petrosa* was seen to be extremely porous, and having, from the section of numerous and large vascular canals, a cancellated aspect. The openings of the cut canals were larger towards the outer surface, and the structure became more and more compact in passing from without inwards. Besides the canals, there were a considerable number of dark interspaces resembling those which are occasionally seen in imperfect or faulty tooth-bone, and which were probably due to imperfect calcification.*

In all these cases, whatever character the exostosis may assume, how far it may extend, or upon whatever tooth it may have formed, when the disease gives rise to any suffering or inconvenience on the part of the patient, there is but one remedy, and that is extraction. The only difficulty consists in the diagnosis, and in this matter the Dentist must be guided by the symptoms which have been previously described.

INTRODUCTORY LECTURE ON DENTAL MECHANICS,

DELIVERED AT THE METROPOLITAN SCHOOL OF DENTAL SCIENCE,
THURSDAY, NOVEMBER 7, 1861.

BY A. HOCKLEY, M.C.D.E.

GENTLEMEN,—When a few months since I undertook to deliver a portion of the lectures on Mechanical Dentistry at this School, in conjunction with my esteemed friend, Mr. Perkins, I did not expect I should be called upon to address you at this early period of the Session, or that I should have to undertake the entire responsibility of the course. Since that time, however, Mr. Perkins has felt that his health, in addition to the demands upon his time, will not allow him to continue the duties of lecturer. In consequence of this, I have been called upon to commence what I feel to be an arduous and difficult task. I cannot help, also, observing that this feeling is greatly increased by a knowledge that

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* *Transactions of the Pathological Society for* 1855.

I am following one who possesses a thorough practical acquaintance with that branch of Dental Science which he was so well qualified to teach. I am sure it is a matter of regret to myself that I should lose the advantage of his co-operation, and this regret I am certain must be participated by all who are interested in the welfare of the School. I am, however, happy to inform you, and I am sure you will be pleased to hear, that Mr. Perkins has just received the well-merited compliment of being appointed one of the Board of Examiners of the College of Dentists, where I trust he may long continue to watch over the interests of our profession, and to promote the progress of Dental Science.

It is hardly necessary for me, gentlemen, to remind you of the active part I have taken in the proceedings of our College, or the pleasure with which I hailed the establishment of the Metropolitan School of Dental Science. When, therefore, the lecturers of that School invited me to take part in the delivery of the lectures, I felt bound to respond to their request, and devote my best energies to the task they had assigned me. Indeed, I do not hesitate to say, that I experienced a degree of gratification at being called upon to aid in so important an undertaking as regards the education of the future members of the profession. There is, however, a vast difference between the conception of an idea, and the carrying it out to its completion. I have, indeed, felt this since I entered upon the fulfilment of my promise. It is one thing to possess a knowledge of an art, and it is another to impart that knowledge to others. It is in the latter respect I feel myself to labour under difficulties that do not beset the experienced lecturer. I have not only to teach, but I have also to learn the art of teaching; and but for my previous association, not only with the lecturers, but also with many of the students of this School, I should have shrunk from assuming so great a responsibility. If, however, I am inexperienced in the art of lecturing, I am not altogether ignorant of the difficulties which beset the student in entering upon the mechanical part of his profession, or of those little failures which sometimes render him disheartened and dissatisfied.

At the time I entered the Profession, the Dentist had, to a great extent, to rely upon his own resources, and every step in the making of artificial teeth had to be performed by himself. This is no longer the case, and the Dentist, if practising in one of our large towns, or within reach of the metropolis, can now obtain from the depôts all the contrivances which modern ingenuity has suggested. Springs, swivels, gold alloyed in all proportions, solders of various degrees of fusibility, wire of different sizes and hardness, are all at his command. The consequence is, that many who are now in practice, would, if thrown upon their own resources, be utterly at a loss to prepare the materials which they find ready to their hands. There are, however, many of you who may in all probability hereafter be beyond the reach of these artificial resources. It is no stretch of the imagination to suppose that at least some of you will find yourselves settled in some distant colony where such assistance cannot be obtained, and unless you are able to manufacture these articles for yourselves, you will be sadly perplexed and discouraged. For this reason, then, I hold, that every Dentist, and certainly every one who professes to call himself a workman, should be thoroughly acquainted with all the details of his Profession, and that while he may avail himself of the materials ready prepared for his use, he should not be dependent upon them. This, then, is the broad mark of distinction between the mechanical department of the Profession when I commenced the study of it, and what it is in the present day. It was in the absence of all such aids as those to which I have alluded, that the Dentist had to make his way. It is because I learned in this working school of Dentistry, and was taught to depend upon my own resources, that I trust I may possess some of the qualities requisite to a teacher, and that I may be able to impart to you that kind of knowledge, and that familiarity with the details of mechanical dentistry, which, in my opinion, every practitioner should possess.

Before I proceed further, I would desire to say a few words in answer to the objections which have been advanced against lectures upon Dental Mechanics. These objections may be briefly summed up as follows:—1st, That Mechanical Dentistry cannot be taught by lectures; and, 2ndly, that such lectures only impart knowledge that has already been acquired in the workroom.

With regard to the first objection, that Mechanical Dentistry cannot be taught by lectures; in that I fully concur. It is unquestionably necessary, in order to become a good workman, that a man should set himself down to the workbench, for there only can he acquire a thorough practical knowledge; at the same time, the information which he obtains is, generally speaking, essentially of a routine character. The pupil does that which he is told without any knowledge as to the reason why it is done. How many excellent workmen are there, who if suddenly called upon to treat cases in the mouth, would find themselves at fault. "The construction and insertion of artificial teeth," says Harris, "is an operation which, though acknowledged to be of great importance, and performed by everyone having any pretensions to a knowledge of dentistry, is, unfortunately, but little understood by the majority of practitioners. The mouth is frequently irreparably injured by their improper application. A single artificial tooth badly inserted may cause the destruction of the two adjacent natural teeth; and if the deficiency thus occasioned be unskilfully applied, it may cause the loss of two more, and in this way all the teeth of the upper jaw are sometimes destroyed."*

The lecturer on surgery or medicine never pretends to teach the one or the other solely by means of lectures. All he does is to lay down the broad principles which should guide men in practice. It is at the bedside of the patient that the pupil must learn to apply these principles; the lecturer only clears away some of the difficulties which beset the path of the student, and places him in the most favourable condition for availing himself of those great practical lessons which he will learn in the sick-room, or in the actual presence of disease. In the same manner, I consider that lectures on dental mechanics are merely subsidiary to the practical teachings of the workroom, and I am also of opinion that it is a great advantage to the student to have the various methods brought before him, the principles upon which they are conducted explained, their relative advantages pointed out, and the cases shown in which each will be most applicable.

With respect to the second objection that lectures can only impart to you knowledge which you have already acquired in the workroom, I would observe that there are frequently various ways of accomplishing the same object, but as the Dental Profession has been constituted up to a comparatively recent period, each practitioner, generally speaking, learned only one of these methods, and as he found that answer his purpose, he seldom troubled himself to inquire into the merits of others. The pupil was, of course, taught to pursue the same method, and thus a plan was handed down from one practitioner to another, each following in the footsteps of his predecessor, and each ignorant alike of every other method, and, therefore, of the relative merits or demerits of his own. Even if the plan taught should happen to be the best, yet emergencies are constantly arising when another could be used more advantageously, and it is he who is ready for such contingencies that must make the best workman. I am confident that if you have conversed together upon the proceedings of the workroom, you must have found that there are many and striking differences between the methods pursued. I might instance such an example as the fitting of clasps. The majority form them in separate pieces, but there are some who adhere to the plan of striking them up from the plate. I myself adopt the former plan which is that in general use, but those who advocate the latter plan are not wanting in arguments to support their views, and no doubt in some cases it may be a more convenient and expeditious mode of proceeding. I, however, merely instance it to show what different opinions may be entertained upon the most ordinary operations of the workroom. Indeed, there is hardly any one proceeding which may not be accomplished in more ways than one, and of which it behoves us to ascertain the best.

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* *Principle and Practice of Dental Surgery*, by Chapin A. Harris, M.D., D.D.S., p. 658, seventh edit., 1858.

Again, there is another and a still more important point to be considered, and that is, that in consequence of the great facilities which the Dentist enjoys, at the present time, for shortening his labour, there are workrooms in which many of the details of Mechanical Dentistry are never performed at all, and of which, therefore, the pupil cannot obtain either practical, or even theoretical, knowledge. As an example of this, I may mention the alloying and melting of gold for plate, and the making of solders, a point requiring great nicety and exactness, for if the solder does not bear a proper degree of fusibility in proportion to that of gold to be soldered, the labour of a day may be destroyed in a moment. Even in the use and application of the inferior metals, such as zinc, lead, and fusible metals, many useful hints may be given to the student.

It may be said that your lectures on Chemistry will supply you with this kind of information, but that is hardly the case. The lecturer on Chemistry teaches you the general principles of the science, and gives you the history, more particularly, of the substances used in Dentistry; but beyond this, he does not proceed. He imparts to you a knowledge of the properties of these bodies, but the practical application of that knowledge to your special pursuit is left to yourselves; it is precisely at the point where his teaching ceases that the lecturer on Mechanical Dentistry commences, and it is the duty of the latter to explain to you the practical application of these substances, and their properties, to your particular pursuit.

Something of the same kind may be said of the relation which the lectures on Mechanical Dentistry bear to those on Anatomy and Dental Surgery. The first of these sciences teaches you the structure and physiology of the dental organs, the second treats of the diseases to which these parts are liable, and the means of cure. But as bearing on dental practice, there are points at which this knowledge would be incomplete without the supplementary information which is afforded by Mechanical Dentistry. Pivotting of teeth, the treatment of irregularities, and the insertion of several teeth, or of entire sets of teeth, are operations which would be very imperfectly understood, were the general studies of the pupil not supplemented or rather completed by the present course.

Such, gentlemen, are some of the purposes which may be fulfilled by means of lectures. It would be folly for me to suppose that these lectures can ever supersede the necessity of actually working at the bench, but they may form a very important adjunct, and by teaching the pupil the principles upon which his proceedings in the workroom are carried on; the practical application of those properties of the metals which he has learned in his chemical studies; the nature and properties of other materials which he has to employ; they may impart to him that scientific knowledge, without which he is a mere follower of other men's ideas, and, like the horse in the mill can only pursue the beaten track which has been marked out for him; a knowledge without which, he is deficient of that self-reliance which will enable him to surmount unexpected difficulties, and to carve out a pathway for himself.

With these objects in view I shall occupy the first part of this course in describing the various apparatus which the dentist requires for carrying out all the details of this department of dentistry. I shall put aside the assistance which he can obtain, and the various articles which he can purchase ready for his use; and for the time, I shall suppose him bereft of all such resources and as having to furnish them for himself. This will lead me to describe the principle and construction of the various apparatus required by the dentist, such as, furnaces for the melting of gold and other metals; flatting mills for converting the gold into plate; the draw bench for forming wire; the lathe for grinding, and for polishing; the anvil, with the various forms of hammer, and other appliances used in striking up plates; and the vulcanizer as adapted to steam heat, dry heat, and super-heated steam. Having given a brief notice of the other implements required in the workroom, I shall conclude that portion of my course by describing, and illustrating, the process of hardening and tempering steel, a subject which I consider of sufficient importance to merit your special attention.

The next division of my lectures will be devoted to the consideration of the metals and other materials used in the construction of artificial teeth. Gold, as the most valuable and most important, will first engage our attention. We shall discuss the various alloys of gold, with reference to its ductility, and required fineness for plate: its hardness for clasps or wire, and in respect to its different degrees of fusibility when required for soldering, also the method of making spiral springs and swivels either by hand or by machinery.

I shall then explain and show you the various methods employed for separating the baser metals and other foreign substances from gold, as exemplified in the reduction of gold filings, or '*Limaille*,' as well as the means employed to collect the gold from the sweepings of the work-bench, and the washing of the hands, for it will be found that in the workroom, as in Nature nothing need be lost, and everything may be turned to account.

The other metals occasionly used as a base for artificial teeth as Platina, Palladium, Dental alloy, and the like, will also engage our attention. While speaking of the metals I shall describe the

American process, known by the name of Cheoplasty, and also the application of alluminium to dental purposes according to a plan patented by Mr. Harrington a member of this college.

Although the use of bone has almost been superseded, still it is right you should be made acquainted with the various methods of using it, in connection either with natural or mineral teeth.

The last, and I cannot help adding the most valuable material which has ever been added to the resources of the dentist is Vulcanite. This substance I shall fully consider and shall describe the various kinds, the different qualities, their respective merits, the various cases to which this material is applicable, and the method of working it. This division of my subject will necessarily require that I should introduce to your notice the several varieties of mineral teeth which are now manufactured, their respective advantages, and the different ways in which the are inserted in the mouth.

The two first divisions of my lectures having been occupied with a description of the materials used in the construction of artificial dentures ; my third division will include the application of these materials to the various cases in which artificial teeth are required. This will comprise first the preparation of the mouth and determining the description of artificial teeth which are best adapted to each individual case. The next step will be the taking impressions of the mouth, with an account of the materials employed for that purpose. Having given some general instructions on these points, I shall proceed to the making of the plaster model and the best mode of preparing it for casting in metal. I shall then commence with the cases in which one or more teeth are required, and finally describe the method of forming entire sets of teeth, to be adapted to the mouth, either by means of spiral springs, or by atmospheric pressure.

The last division of my subject, will consist of the treatment of irregularities of the teeth, by mechanical appliances, and the construction of artificial palates.

Having thus sketched out the plan, which I intend to pursue, I shall endeavour to treat my subject in as practical a manner as possible, and I trust, that by placing before you, examples of the various processes in their different stages, to give an interest to the course which cannot be obtained by mere verbal description, I shall have frequently to detain you with matters, with which many of you are already familiar, but it is my duty to bear in mind, that there are several amongst you, who are now entering upon their studies for the first time, and for this reason, it is absolutely necessary, that I should not omit any of the more simple or elementary processes, which should occupy the student during the first years of his pupilage. I would also strongly impress on the minds of you all, that there is probably no mechanical pursuit, in which success depends so much upon every step being carefully and properly performed. I need not remind you of the great advances which have of late years been made in this department of our Profession. Even the youngest amongst you, must be aware that the entire aspect of Mechanical Dentistry has of late been changed. There is no longer an exclusive or secret process, by which one practitioner can boast of his superiority over the other. Henceforth, the success of the Dentist must depend upon the knowledge and skill, which he brings to bear upon the common materials at his command. This knowledge and skill, which are the true elements of his future success, can only be obtained by diligent attention to his duties and studies, during the first years of his studentship. Lastly, gentlemen, I would observe that I have only advocated that union of scientific principles and practical knowledge, which was so greatly advanced in the various branches of industry throughout the Kingdom, by means of the Great Exhibition of 1851. Speaking of the results which were brought about by this gathering together of the World's Industry, and the effects it would have upon the Mechanical Arts, Professor Willis, says, " The first object is to effect a more intimate union between scientific and practical men, by teaching them reciprocally their wants and requirements, their methods and powers, so that the peculiar properties and advantages of each, may be made to assist in the perfection of the other. The second object, is to promote a more universal knowledge amongst mechanics and artisans, of the methods and tools employed in other trades than their own, as well as of those employed in their own and other trades."

" With respect to the first object, it is no secret that there has always existed an unfortunate boundary wall between practical and scientific men, a mutual distrust or misunderstanding of their relative values which has deprived them of many great benefits that they might have mutually derived from each other's pursuits. It is true that in many branches of science, as in Chemistry, Geology, and Botany, this barrier has, to a great extent, been broken through. The practical man has found the benefits of scientific generalisation, and the theorist has been compelled to seek the facts upon which his theories are to be based in the mines and manufactures, thus compelling the two classes to work, and learn to understand each other. Still, there remains too much of the ancient contempt for 'theory,' and of overweening and conceited value for 'facts' and 'practice.'"* The same spirit has long pervaded the workroom of the Dentist, and one of the first great innovations which has tended to break down the old barriers that had been set up by self-conceit and routine practice was the establishment of a School of Dental Science. Regard me, then, gentlemen, as a student among students, prepared to be taught as I am ready to teach. Let us endeavour, by an interchange of ideas, to add to that which we already know; and, above all, let us mutually endeavour to promote and to maintain the interests and honour of our Profession.

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* *Great Exhibition Lectures*, p. 297.

THE DENTAL REVIEW.

LONDON, FEBRUARY, 1862.

In another part of our Journal will be found the Fifth Annual Report of the Council of the College of Dentists. We commend this document, containing an account of what the College has done during the past five years, to the notice of our readers.

Considering the very derogatory terms in which the Members of the College of Dentists have been spoken of by their opponents, these gentlemen have been marvellously successful in counteracting the proceedings of the College of Surgeons and its dependants. Notwithstanding the prestige and influence which belong to this chartered body, the wrongs they were urged, by a select few, to inflict upon the Dental Profession generally, were so apparent that the legislature refused to sanction them. In 1858, when the Medical Bill was passing through the House of Commons, the Council of the College of Dentists succeeded in preserving to the Dentists the rights they had previously possessed. The petitioners to the College of Surgeons desired a monopoly, the Government only granted them a right to trade in dental certificates. The Council of the College of Surgeons have always been true to their original principles of self-election and non-responsibility. The last proof they have given of their political consistency has been the establishment of the Dental Triumvirate in Lincoln's-inn fields.

As it is by means of the Examining Board that the College proposes to reign over its dental vassals, it may not be amiss if we compare its constitution with that of the original Council of the College.

When the first charter of incorporation was granted to the College of Surgeons in 1800, certain surgeons connected with the metropolitan hospitals were appointed to constitute its Council. The charter delegated to the Council absolute and irresponsible power over the surgeons of England, and, what was still worse, allowed them to appoint their successors. The power of nominating the Council thus became, as it were, hereditary, and was transmitted from one generation to another. This opportunity of selection and favouritism was always exerted by the Council in favour of the hospital surgeons, and of their relatives or pupils. Such an arrangement answered two purposes; it kept the control of the surgical profession entirely in the hands of the Council, and gave the hospital appointments a pecuniary value they did not otherwise possess. Formerly, it was no uncommon thing for a hospital surgeon on the Council of the College to receive a fee of five hundred guineas with each pupil. To be attached to one of the Council of the College of Surgeons, not only gave the pupil the best introduction to his profession, but bestowed upon him a prospect of an hereditary place in the Council. These abuses did not continue without remonstrances on the part of the profession, and in 1834 resulted in a parliamentary inquiry. It is not many years ago that one of the Council told the assembled members, who had expressed their disapproval at what had fallen from him, that he was not to be frightened by a parcel of geese. The pressure of public opinion at length became too strong to be resisted. The consequence was the creating of a body of Fellows in 1843, on whom the Council tardily and grudgingly bestowed the privilege of electing the governing body.

Ex pede Hercules, as the parent so is the offspring. The Dental Examiners have been appointed in a similar manner to the original Council of the College of Surgeons. So far as it is in the power of the College to bestow it, the Examiners have the same absolute and irresponsible authority over the Dental, as the Council itself formerly possessed over the Medical Profession. Up to the present time, the acts of the Dental Examiners have by no means belied their origin. The privilege of being examined for the dental certificate appears to rest entirely in their hands, and they have already exercised this power in a very arbitrary manner. Some persons have been admitted who are far from being an honour either to the Dental or Medical Profession. Other practitioners, holding an honourable position as Dentists and respected by their fellow-townsmen, have been ignominiously refused examination. Although circumstances point to one individual as the chief arbitrator of the fate of his professional brethren, still, so long as the other Members of the Board sanction or permit of such unjust proceedings, they must be content to share the odium which attaches to them. The rejected candidates have no redress, the authorities do not condescend to enlighten them as to wherein they have incurred their displeasure, and they must be content to be branded at the option of the Dental Examiners, as unworthy to hold the certificate of the College of Surgeons and—as a necessary inference—unfitted to practise their profession. Under the present constitution of the Examining Board, what probability is there that the examinership in Dental Surgery will not become as much hereditary, as was formerly the case with a seat in the Council? The appointment will still rest with the Council, and experience tells us what this will lead to. The power thus improperly bestowed, will be exerted in favour of the Hospital Dentists, of favourite pupils, or of some special protegés of the governing body. The provincial practitioner in Dentistry, however high his standing in the Profession may be, will have but little chance of his merits being recognised, and the regulation of the Dental Profession throughout England will thus be entirely in the hands of three of the Metropolitan Dentists and the Council of the College of Surgeons. That such a state of things will eventually fall to the ground, there cannot be a doubt. There is, however, no necessity that the abuse should continue, or if it does, that it should be sanctioned by the members of the Dental Profession. The question is, will the Dentists of England profit by the experience of the Surgical Profession, and at once free themselves from the bondage which is attempted to be thrown over them? If the majority of the profession will not unite to assert their independence, and maintain a College, which shall consist of and be governed exclusively by Dentists, we can only regret their apathy as to the future welfare of the Profession. If the College of Surgeons is allowed to pursue its course, then the same yoke will have to be borne by the Dentists, which was formerly supported by the Surgeons. Another three and forty years of wrong and oppression on the one side, and of heart burnings and discontent on the other, may pass away before a remedy shall be obtained for the evils inflicted on the Dental Profession by the eighteen petitioners of 1856.

Let not our readers suppose that we are arguing for individuals against individuals. Politically speaking, we are indifferent as to who forms the executive of an independent Dental College. It is the principle and not the individuals which we advocate. We have supported the cause of the College of Dentists of England, because it alone represents that form of organisation which we desire to see established in the Profession. If, however, independence could be obtained more readily, or more efficiently, and if the cause would gain more general acceptance from the Profession were it under other superintendence, than that which now directs the Council of the College of Dentists, let it show itself, and we will be the first to support it. At present, the destiny of the Dental Profession is in the hands of its members, and all we say to them is: Suffer not the Profession to stray into the wilderness of serfdom, where, like the Israelites of old, it may wander for forty years, ere it again reaches the promised land of independence.

WITH the first number for the new year, the 'British Journal of Dental Science' has changed its outward form and appearance. Its former unwieldy size has been reduced within the ordinary dimensions of a modest octavo, it has doffed its outer covering of black and white, and clothed itself in a coat of pale and delicate green. When the journal came before us, with its improved outward appearance, we could not help wondering if it were equally improved in spirit and in morals, or whether, like other mortal beauties, its charms were only skin deep. We paused anxiously ere we entered upon the perusal of that portion of the journal devoted to the denunciation of all non-conforming dentists. We had not, however, proceeded far, before we found that it was only the story of old friends in a new dress, and that it was still the wolf in little Red-riding Hood's cloak. The Editor commences with a very doleful lamentation, that he and his party should have provided so many good things for the Dentists, and yet they should be so perverse and self-willed, that when all has been made ready for the banquet, they will not sit down to the feast. Strange that men should hesitate between the Editor's "respectable and scientific body," and "a position on the other hand, which gives them neither legal right to practise, nor any title to be associated with educated and respectable men." Now, with regard to this legal right, of which so much is said, we unhesitatingly assert that the Dental Certificate of the College of Surgeons bestows no legal right whatever, it is simply an honorary certificate, in which the three surgeons—who know nothing about Dentistry—and the three Dentists—whom we have elsewhere shown, select and reject as they please—tell the fortunate possessor that in their opinion he is fit to practise as a Dentist. With regard to the latter part of the sentence, no one will consider it polite, and the majority will regard it as the splenetic abuse of a disappointed partisan.

Of all the unfortunate comparisons which a writer in the 'British Journal' could possibly have selected, that of comparing the dentists with the pharmaceutical chemists, is the very worst. The political position of the pharmaceutical chemists has been so precisely that of the College of Dentists, that any argument which could be drawn from the conduct of these gentlemen, must be in favour of the independent position assumed by the College. When the pharmaceutists had organised themselves into a society, and desired to have their position recognised and powers granted them by the legislature, they were foiled in their endeavours by one of the chartered medical bodies. The Medical Act of 1815 bestowed upon the Apothecaries' Company a monopoly of medical practice combined with the sale of drugs. Fearing that some of their privileges or profits, might be encroached upon by the pharmaceutical chemists, the Apothecaries' Company have constantly opposed them. Precisely in the same manner the interference of the College of Surgeons has deprived the Dental Profession of their just rights and privileges, in order that they may reserve to themselves a monoply in the granting of the dental certificates.

Having terminated his cry of lamentation, and exhausted his own powers of eloquence and vituperation, the Editor falls back upon one whom he designates as an eloquent writer, in the 'Lancet,' quoting the expression, "a band of gentlemen clubbed together to call themselves the College of Dentists of England," which was recently made use of in that journal. Who can do otherwise than admire so terse, so eloquent a passage. Shades of Johnson and Macaulay look to your laurels! But why should not so charming a piece of writing be given in its entirety? why omit the word *lately*, before "clubbed together," as it stood in the original passage? Does the Editor consider it necessary to be exact as to time, in order to compensate for his wilful perversion of facts. The Editor should remember, that the writer in question, when he penned the above passage, intended it for the eyes of the medical profession. In that case, he could trust to his readers' ignorance of the mode in which the College of Dentists was established. When, however, the same statement is paraded before the Dental Profession, the writer merely stultifies himself. Every member of the Profession, whatever may be his political opinions, knows that the College of Dentists was established nearly six years ago at a public meeting, where more than two hundred Dentists were present, and where every Dentist had the right of entry, and could, if he had so desired, have protested against the proceedings. The Council was elected in the same public manner, and it has ever since acted in accordance with the rules, which were prescribed to it at the only public meetings of the Dental Profession, which have been held in this country.

There are some minds so constituted, that they appear to be incapable of learning wisdom from experience. For five long and weary years, the Editor of the 'British Journal' has gone on perverting facts, and slandering and abusing his neighbours, yet he is fain to allow at the end of that time, that his labour has been in vain. Why then is he determined to persevere in the same dishonest and disreputable course? Let him confess that the principle of an independent organisation of the Dental Profession is not so wicked or absurd, but what it admits of debate. Let him acknowledge that all the good is not on his side, nor all the evil with his opponents; not until he does this can he be listened to with respect, nor can he in any other way remove the stigma which must inevitably attach itself to a cause maintained by such unworthy means as have been resorted to in support of the Dental certificate of the College of Surgeons.

If, indeed, the certificate of the College of Surgeons is so pregnant with good to the Dental Profession, and the certificate of the College of Dentists so charged with sorrow and disgrace, as the Editor of the 'British Journal' endeavours to persuade his readers, why should he disturb himself? He cannot, surely, have any fears that so bad a cause can triumph over one so good? For our own part we are content to abide the issue, fully believing that that which alone can be said to represent the Dental Profession, and which preserves to it its rights, will sooner or later prevail.

SELECTED ARTICLE.

PROFESSIONAL JEALOUSY.

By J. H. M'QUILLEN, D.D.S.

(From the 'Dental Cosmos' for August.)

In connection with Dr. Allen's paper on this subject, which is presented in another part of the magazine, we would direct attention to a fact, which no doubt has been noticed by every careful observer, that what the world calls *conversation* is—with some fractional differences, too small to be noticeable—mainly *biographical* or *autobiographical* in its character; in other words, friends and acquaintances, as a general thing, entertain each other with what they have done, are going to do, and can do ; or what others have not done, should not do, or cannot do. There is this difference, however, between refined and elevated natures, and low and grovelling spirits ; the first finds pleasure in contemplating the excellences, and only regrets at the shortcomings of human nature : while the latter apparently gloats over the imperfections of others.

When that eminent orator, dramatist, and wit, Richard Brinsley Sheridan, makes Sir Peter Teazle, in 'The School for Scandal,' say in reponse to the hostess, on leaving a party where the characters of all their absent friends and enemies had been severely commented upon, "Your ladyship must excuse me ; I'm called away on particular business : but I leave my character behind me,"—he gave unmistakeable evidence of his knowledge of the common practice of small minds, whose pitiful natures can find no higher occupation than that of traducing those with whom they are brought in contact by the relations of business or pleasure. Looking entirely upon the dark side, magnifying each defect, and suppressing everything that could be said to the advantage of others, such persons appear to be actuated by the desire to drag others down to their own level, find extenuation and countenance for their own faults, or, in the language of Butler,

"Compound for sins they are inclined to,
By damning those they have no mind to."

The comments of such persons have a wide range, from the character of the individual to everything emanating from or connected with him ; and it would be singular if a defect thus common with a portion of the world should not invade, to a certain extent, the profession of Dentistry. That such is the case, the communication referred to, and the experience of every practitioner, no doubt will more or less corroborate.

A lengthened and intimate acquaintance with a large number of the Profession, who, as a general thing, in commenting upon their fellow-practitioners, have expressed themselves in terms of admiration and respect, or, where they could not say anything to the advantage of another, have refrained from giving utterence to their sentiments, induces us to believe that the disposition to malign their fellows is the exception, rather than the rule, with those who feel a deep interest in the advancement of the Dental Profession.

Although it will be readily conceded that those who can indulge in such practices are unworthy of notice, yet it is an indisputable fact that very few worthy men have frequently allowed themselves to be unnecessarily annoyed by the ungenerous comments or *reported* comments of others. And here we would take occasion to say that the majority of the remarks which are carried backward and forward between practitioners by their patients should be received with many grains of allowance; and when one feels that he has ben aggrieved by the strictures of another whom he has been accustomed to respect, in place of nursing his trouble in secret, let an explanation be demanded; and in nine cases out of ten, the word unkind, or wrongly taken, which has often severed the most intimate professional relations, will be found very different from what it was when magnified in importance by the talebearer.

Admitting, however, that one really has been maligned by the innuendoes, the covert or open attacks of a practitioner, or that a number of them waste their time in the same elevated occupation; what then? Work on, the same as if they were not in existence, and, making no response, allow a life to speak in itself. What folly it would be to elevate such persons of importance by noticing them, engage in a fruitless encounter, exhaustive alike of time, energies, and temper, or allow a feeling of despondence to overcome one to such an extent as to dampen all ardour for improvement and advancement!

So far as the active purposes of life are concerned, there perhaps can be no more deplorable state of mind than that last referred to. Every one, according to temperament, is more or less liable, when things appear to be going wrong, or the system is a little out of order, to moments of despondence In healthy physical and mental organisms, such feelings, however, are only ephemeral in their existence; but some persons are so unfortunately constituted, that they succumb without a struggle to difficulties and oppositions which only tend to develope the latent powers and energies of others. They lack that indomitable energy which enables such natures, when difficulties are to be overcome, to labour on while the world rests, and who, undiscouraged by reverses, make more careful preparation for the future.

There can be no question that talents are not always recognised as promptly or as fully as they should be; but no one has a right to say on that account that the world opposes and does not show him a fair chance.

According to individual estimates, there are many thousands—ay, millions—of neglected geniuses; but as they afford the world no tangible proof of the fact, their *ipse dixit* not being regarded as all-sufficient evidence, the claim is denied, or passed over in silence and neglect.

If the physical or intellectual capacities of men are not equal to the struggle demanded by their aspirations, if their love of ease and pleasure is so great that they allow opportunity after opportunity to pass by unimproved, or if they waste that time in useless repinings and vain regrets which should be devoted to self-culture physical, moral, and mental, they have no right to blame the world, for the defect is with themselves; and the sooner they adopt the advice of the Delphian oracle, "Know thyself" the better it will be for themselves and others. Truly has it been said that he who conquers himself is greater than he who conquers many cities.

Far from the world opposing, it is ever willing and *eager to help those* who *help themselves*; for he who helps himself not only creates a feeling of self-reliance and sets a good example, but also helps the world by the act. He is not a mere consumer, but in every sense of the word, a producer, and, like every labourer, is worthy of his reward. This he will gain, sooner or later, when his abilities, application, and integrity are justly recognised and appreciated.

To a properly-constituted mind there is a genuine and heartfelt pleasure in rendering aid and encouragement to those who are struggling upward against every obstacle. One thus engaged, however, is only making just acknowledgement and compensation for similar services received from others in former days.

It is often, thus, in the power of one Dental Practitioner to render a tribute of respect to another, or for an old member of the Profession to assist a young one; and when the opportunity afforded, or when one is questioned by a patient with respect to the attainments and capabilities of another, worthy of respect, in petty jealously or smallness of mind should induce one to damn with faint praise, but in a frank and manly manner give a thorough indorsement of his capacities. Such a course will not detract an inch from one's stature, and he who adopts it will find that he can afford to continue it.

There are cases, however, presented to the notice of the practitioner, in which he has called upon to pronounce judgment upon the failures of others. Let this be done with all justice to the patient and charity to the operator. The truth must be told, for that hurts no one; but in commenting upon failures, it is far better to deal leniently with them. One does not know all the circumstances and influences beyond the control of the operator that must have brought about such results. Again, if he expects any charity to be shown to his own shortcomings, he must extend it to others.

An experience of years, and large opportunities for observations have taught us that, as a general thing, those who are loudest in denunciation of the failures of others have the greatest need for charity on the part of their compeers, so far as their own operations are concerned.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

ANNUAL GENERAL MEETING.

THE Fifth Annual General Meeting of the Members was held on Tuesday evening, January 21st, 1862, GEORGE WAITE, Esq., President, in the chair. The minutes of the last Annual Meeting having been read and confirmed, the President called upon the Honorary Secretary for the Report, which was read as follows :—

COLLEGE OF DENTISTS OF ENGLAND.

FIFTH ANNUAL REPORT OF THE COUNCIL TO THE MEMBERS

IN presenting the Annual Report to the Members, the Council are reminded that the present occasion marks the completion of the first quinquennial period of the establishment of the College of Dentists of England.

The opportunity, therefore, appears suited to a few observations on the momentous events which have taken place in relation to the Dental Profession during the last five years.

When, at the close of 1856, the public meetings of the Profession were held, which resulted in the formation of this College, there prevailed a considerable amount of enthusiasm, and a reasonable expectation that the movement would be attended with complete success. But opposition speedily arose. It soon became apparent that the organisation of the Dentists of England into an independent and responsible body, was not to be accomplished without encountering more than the usual amount of difficulty common to almost every undertaking of a reformatory nature, however praiseworthy.

It is unnecessary to follow the steps, sometimes insiduous, sometimes open, which have been taken to subvert our institution. It suffices to record, that notwithstanding the powerful opposition brought to bear against the College, it has safely passed through the many trying ordeals of the last five years, and that during that time, the objects aimed at have been steadily pursued, and many of them attained. The success, thus far witnessed, affords a convincing proof, that the principles upon which the College was established, were founded on equity and truth ; but for this it must long since have yielded to the unjust charges and violent attacks of its opponents. Had those members, who first joined the College, and sanctioned its formation, remained true to the principle of independence, no opposition, however powerful, could have prevented its complete success. The unfortunate disunion which arose in the Profession upon the question of the College of Dentists amalgamating with the Odontological Society, has never been overcome. With troubles in advance, the wavering and the lukewarm naturally retired, while others, who were favourable to the College, were prevented from joining. Nevertheless, a sufficient number of Members were found remaining steadfast to their original principles to carry out the objects of the College.

The results which have ensued from the united action of the comparatively few practitioners whose names find honourable mention in the Roll of the College, may be fairly estimated by comparing the state of the Profession prior to 1856, with its condition at the present time. The College possesses in itself all the requisites for uniting the Dentists of this country into an independent and recognised body. It has established a School of Dental Science, furnished with every means for imparting to the pupils a practical knowledge of their profession. Within the last few months, the opening of the National Dental Hospital has provided a wide field of operative Dentistry, which was alone wanting to complete the educational arrangements. That this department of the College has been appreciated by the junior Members of the Profession, is shown by the number of students who have joined the classes, and the proficiency which they have made in their studies.

The Council are fully aware that, notwithstanding all that has been accomplished, one desideratum remains—viz., the possession of a Charter. The obtaining of this legal recognition rests with the great body of the Dental Profession, who have hitherto stood aloof from either party. At the present time, the relative numbers of those who have taken part in the political proceeding of the last few years, and those who have remained passive, are nearly the same as they have been during the last three years. The Members of the Profession who form this neutral body should, however, remember that they are in reality giving up the independence of the Profession, and by their inaction aiding in its subjection to the College of Surgeons.

The possession or non-possession of the Dental Certificate of the College of Surgeons, or the Certificate of Membership of the College of Dentists, may be of little consequence to those who are in actual practice. To those, on the other hand, who have recently joined, or who may hereafter join the Profession, it is of the utmost importance that the College of Dentists should become a legally-constituted body. Let those who are interested in the future welfare of the Profession, carefully consider the positions in which the College of Surgeons and the College of Dentists stand, in relation to the Dental Profession. The Dental Certificate of the College of Surgeons bestows no legal rights upon its possessor, nor does it even confer any of the privileges which belong to the Members of that body with respect to the College itself. The Council of the College of Surgeons is elected by the Fellows of the College, exclusively from amongst their own body, so that even the ordinary Members of the College have no voice in its government. It is unquestionable that under such an arrangement, Dentists will never be permitted to regulate their own Profession, which will be entirely under the arbitrary government of the Fellows and Council of the College of Surgeons. Let these facts be compared with the constitution of the College of Dentists. Everyone belonging to the College is a Member of the Dental Profession. There is no distinction of rank into Fellows and Members ; all are on equality, entitled to the same rights and privileges, and each has a voice in the election of the governing body. The Council are elected annually, and can, therefore, only hold office so long as their acts meet with the approval of the majority.

In making these remarks upon the importance and desirability of a Charter, the Council would wish to guard against any misunderstanding as regards the perfect stability of the College in its present condition. So long as the Members are as united and as unanimous as they have been during the last four years, no amount of intrigue or misrepresentation can overcome it. Possessing an income in excess of expenditure, with proper care and economy, the Council will have no difficulty in carrying out the Lectures, the Monthly Meetings, the Conversaziones, and the publication of the Transactions, as they have hitherto done. The Profession should also bear in mind the different position in which the majority of Dentists would have been placed, but for the active and successful interference of the Council of the College of Dentists. When the Medical Act of 1858 was passing through the Legislature, it was through the instrumentality of the Council that a clause was inserted exempting Dentists from the operation of the Act, and preserving to them their legal rights as they had existed prior to the introduction of the Bill.

Again, in 1859, an attempt was made to give to the Certificated Dentists of the College of Surgeons, the right of having their names inserted in the list of qualified Medical men, pubished by the Medical Council. In fact, to give to them alone the right of registration, and as a necessary consequence, the power of recovering their fees. Had this attempt been successful, it would have had the effect of representing to the public the names of those who had taken the Dental Certificate of the College of Surgeons as alone qualified to act as Dentists, and every one else who did so as acting illegally, and as being in reality an unqualified pretender. It is for these reasons the Council feel they have a claim upon the support of the Profession; and when party-feeling is laid aside, they cannot doubt that an independent organisation will be preferred to one under the control of the College of Surgeons.

In referring to the events of the past twelve months, the Council are conscious that they have, to the utmost of their power, striven to maintain the dignity and interests of the College. With regard to the accusation brought against the College of encouraging disreputable advertising, the charge was most unfounded, and was fully refuted by the President, in two letters addressed by him to the Editor of the 'Lancet.' As, however, it was impossible under the circumstances, to explain the real position of the Council in respect to advertisements, the executive avail themselves of the present occasion to place the matter more clearly before the Members of the College, and the Profession generally.

At the foundation of the College, a law was enacted which expressly provided for the permission of certain forms of advertisements. This law was passed, after due deliberation, at a public meeting where a large number of the Dental Profession were present, and was, therefore, considered essential to its welfare. This law could only be repealed by the voice of the Members at a specially-convened meeting for the purpose. Every Council, from the first formation of the College down to the present, has been bound by this law, and have acted in accordance with it; it is, therefore, most unjustifiable to throw the onus of it upon the present Council. So far has the Council been from encouraging disreputable advertising, that, long before the attacks made upon them, they had removed the names of persons from the list of members who had acted contrary to the spirit of the law, and other persons had been refused admittance into the College for similar reasons. In order to show the spirit which actuated the parties who endeavoured to injure the College of Dentists in the eyes of the medical profession and the public, it is sufficient to mention that, while the name of every person connected with the College, who advertised in any way whatever, was paraded before the public, the names of gentlemen holding the dental certificate of the College of Surgeons, whose advertisements appear daily in the public journals, were omitted from the list. The Council mention this not with any desire to condemn the form of advertisements used by those gentlemen, but to show the unfair and underhand manner in which the members of this College are dealt with by their opponents.

It is gratifying to report that the Metropolitan School of Dental Science has prospered well. The number of pupils has been steadily maintained during the year; and, under the able superintendence of the several lecturers, a great amount of proficiency has been attained by the pupils, as proved by the examinations.

At the distribution of prizes in April, the gold medal of the College for general proficiency was awarded to Mr. N. G. Cox; and the silver medals for proficiency in operative and mechanical dentistry, to Mr. J. Wood.

The courses of lectures to the Members have been two in number—the first, by Mr. Hulme, on "Diseases of the Dental Periosteum." The second, by Dr. B. W. Richardson, on the "Salivary Glands and Saliva." It would be superfluous to say that these interesting subjects were treated with the accustomed ability of the lecturers.

At the ordinary monthly meetings, various papers of a practical bearing have been brought forward and discussed. These meetings have been found most useful in disseminating information on the science and practice of dentistry, and it is pleasing to find that the attendances are steadily increasing. These papers, and the courses of lectures, are now published, and will be forwarded to each Member and Associate of the College.

The Library and Museum have received several additions, for which the best thanks of the Members are due to the respective donors. The Council announce, with regret, the retirement of Dr. Purland from the office of librarian and curator—an office filled by that gentleman with so much assiduity—and their regret, they feel convinced, will be shared by the Members, Associates, and pupils generally. At the solicitation of the Council, Mr. Hulme has accepted the offices vacated by Dr. Purland, so that this important educational department, of which, it may be said, the nucleus only is formed, will continue under excellent guidance.

The subject of a World's Dental Convention, proposed to be held in London during the present year, has been under the consideration of the Council, and should circumstances render the holding of such Convention desirable, it is hoped no personal feeling will be allowed to interfere with the exercise of courtesy due to strangers; certainly no such feeling will be encouraged by this College.

During the present session, in addition to the monthly meetings, two courses of lectures will be delivered, one by Mr. Hulme, on "Dental Materia Medica," and the other by Dr. Richardson, on "The Conditions of the Teeth in various Constitutional Diseases."

It is also intended to increase the Library, with a view to the books being circulated amongst the Members. The circulation of the books will be regulated by such rules as may seem fit to the Library Committee. The Council have reason to believe that such an arrangement will meet the wishes of many of the Members, and receive general support both among the Members and Associates of the College.

Some months back it was proposed to grant a Certificate to Associates of the College, and the Council accordingly drew up such a form of Certificate as they considered would answer the purpose. It was not intended, however, that this certificate should be granted without an examination, as it is obvious such a credential could only be of value when restricted to gentlemen who were fully qualified to undertake their special department.

It is not the wish of the Council to enforce such examination without the consent of the Associates, but, as they believe, it would be of essential service to the Associates, they invite them to consider the matter; and should it meet with their views, the Council will be happy to co-operate with them in carrying out the granting of such certificates.

Late in the year occurred the lamentable death of His Royal Highness the Prince Consort, who was ever foremost amongst the patrons of science. Many Members having expressed a desire that the Council should forward an Address of Condolence to Her Most Gracious Majesty on this occasion of her great affliction, an Address was accordingly unanimously adopted at a special meeting of Council, held on the 23rd ultimo, and a copy transmitted to the Right Hon. Sir George Grey for presentation.

It only remains for the Council to express their sincere desire to do their utmost towards forwarding the complete developement of the College, and its various departments, believing in the continued support of the members, and especially looking to their co-operation in extending its influence by helping to add new members to its ranks.

Signed on behalf, and by order of the Council,—

George Waite, M.R.C.S., President.
Samuel Lee Rymer, } Hon. Secs.
Anthony Hockley, }

Cavendish square, London, January 21, 1862.

The President, in appropriate and congratulatory terms, moved the adoption of the Report, which, having been duly seconded, was unanimously carried.

Mr. James Robinson, Treasurer, presented his statement of the financial affairs of the College, at the same time expressing the satisfaction he experienced in being enabled to announce a balance of income over expenditure.

From the Treasurer's statement, it appears that the total receipts, including the balance of last year (59*l*. 13s.), had been 427*l*. 9s. 6d., and the expenditure 336*l*. 15s. 1d., leaving a balance of 90*l*. 14s. 5d.

It was unanimously resolved that the Treasurer's accounts do pass.

Dr. Purland, Librarian and Curator, in presenting his Annual Report, said that, compared with last year, he had a very short list of presents to offer to the notice of the meeting. He could not expect to be able, on every annual occasion, to command so many donations to the Library and Museum as he did the previous year, when upwards of sixty volumes were added to the Library, and as many specimens to the Museum. He was quite sure that the Council and Members of the College accept with thanks any donation, however small, as they will add value and information to those they already possessed. He was pleased to find that it was contemplated making arrangements to circulate the books amongst the Members and Associates of the College. To carry out this plan will require some assistance from the Members, either by donations of money or books, and he had no doubt that so laudable a design would meet with the encouragement it deserves.

LIST OF PRESENTS TO THE LIBRARY.

Mr. Hulme.—Moquin-Tandon's Elements of Medical Zoology. Translated and Edited by R. T. Hulme, M.R.C.S., F.L.S.
Mr. Runting.—Burns's Anatomy of Head and Neck.
Mr. Smith.—Hooper's Medical Dictionary.

Mr. **Henry**.—Delabarre's Treatise on Mechanical Dentistry, 2 vols., and Smee's Electro-Biology.

TO THE MUSEUM.

Mr. **Williams**.—Models of Cleft Palates, and Specimen of Exostosis.
Dr. **Purland**.—A Mounted Set of Natural Teeth.
Mr. **Vidler**.—Specimens of Dental Pathology.
Dr. **Coar**.—Specimens of Exostosis and Teeth stopped with Gold.
Mr. **Hulme**.—Specimen of Calcified Pulp, Teeth of Wolf-fish, and Section of Jaw of Shark.
Mr. **Henry**.—Sections of Teeth, showing the Progress of Dental Caries.

Resolved unanimously, that Dr. Purland's Report be adopted.

Also, on the motion of Mr. **Spencer**, seconded by Mr. **Runting**, a cordial vote of thanks was accorded to Dr. Purland on his retirement from office as Librarian and Curator, and a like vote to the respective contributors to the library and museum.

Dr. **Purland**, in acknowledging the compliment, assured the Meeting that want of time alone induced him to retire. For the College he had always felt the warmest interest, and for every member of the Council sincere esteem. As a private member he would do his utmost in furtherance of the good cause represented by the College.

The following gentlemen were elected to conduct the affairs of the College during the ensuing year :—

President.—George Waite, Esq., M.R.C.S.

Vice-Presidents.—James Horne, Esq., Glasgow ; William Imrie, Esq., London ; Norman King, Esq., Exeter ; William Perkins, Esq., London ; James Robinson, Esq., London ; J. E. Rose, Esq., Liverpool ; S. Tibbs, Esq., Cheltenham ; W. R. Wood, Esq., Brighton.

Treasurer.—James Robinson, Esq., D.D.S.

Council.—D. J. Brenneis, Esq. ; W. L. Canton, Esq. : Henry T. Kempton, Esq., F.L.S. ; William Pratt Porter, Esq. ; J. Cox Smith, Esq., Chatham ; Robert Tweed, Esq., Colchester ; Thomas Collins Vidler, Esq. ; George Williams, Esq. ; Felix Weiss, Esq.

Honorary Secretaries.—Samuel Lee Rymer, Esq. ; Anthony Hockley, Esq.

Registrar.—Felix Weiss, Esq.

Librarian and Curator.—Robert T. Hulme, Esq., M.R.C.S., F.L.S.

Assistant Librarian and Curator.—George Henry, jun., Esq.

A vote of thanks was proposed to the President, by Mr. **Weiss**, for the firm and able manner in which he had fulfilled the duties of his office, and upheld the interests of the College during the past year. Seconded by Mr. **Williams**, and carried unanimously. A similar compliment was paid to the Vice-Presidents, Officers, &c.

The **President** having responded, the meeting was declared special, according to notice, for the purpose of making a verbal alteration in Law 12, so that it shall read thus :—

"The Council shall have the power of electing as Honorary Members of the College such Members of the Medical or Dental Professions, and others, who have contributed to the advancement of Dental Science, or have distinguished themselves by their scientific attainments."

The alteration was proposed, on the part of the Council, by Mr. **Hulme**, and having been seconded was, after some discussion, unanimously agreed to.

A vote of thanks to the Chairman terminated the meeting.

The following address of condolence to Her Most Gracious Majesty, has been forwarded to the Right Hon. Sir George Grey:—

TO THE QUEEN'S MOST EXCELLENT MAJESTY.

May it please your Majesty,

We, the President, Vice-Presidents, Officers, and Council of the College of Dentists of England, desire humbly to convey to your Majesty the expression of our constant loyalty and heartfelt sympathy.

The irreparable loss your Majesty has sustained in the removal of the Prince Consort, is deeply grieved by the Council, as well as by every member of the College, and they trust that Almighty God, in his great Mercy, will support and sustain your Majesty in this heavy affliction.

The stimulus given to progress in Science and in the Liberal Arts by the departed Prince, exercised the most happy influence over the prosperity and welfare of the country, and must remain as a perpetual monument to his memory. Although lost to your Majesty, this country, and the world, the illustrious Prince's life will ever form a bright example to future generations.

G. WAITE, President.

LECTURES ON DENTAL MATERIA MEDICA.—On Tuesday evening, January 28th, Mr. Hulme delivered the first of a course of lectures on "Dental Materia Medica and Therapeutics," in the presence of a very numerous attendance of the Members, Associates, and Students of the College. The Lecturer opened with alluding to the neglect of the subject in the general works on Materia Medica. In this respect even the valuable and voluminous work by Dr. Pereira was defective. The first lecture was introductory, and contained a brief history of the theories which had been held in medicine. The history of medicine might be divided into four stages: 1st, The primitive or instinctive, when men were guided by their instincts and their feelings; 2nd, The religious, when the care of the body, as well as the spiritual wants of the community, was entrusted to the priesthood; 3rd, The philosophical, when medicine was governed by the philosophical system, or the particular science which prevailed at the time. To these must be added a 4th, represented by its present condition, where it is freed alike from the control of religion or of philosophy, and stands forth as a separate and independent science. Illustrations of the three first stages were given by reference to the theories which had prevailed from the earliest times up to the present day. The doctrine of Hippocrates of the Empirics, and the Methodics, were explained, and mention made of the influence exerted by the writings of Celsus and Galen over medical practice. The Arabian school of medicine existing from the ninth to twelfth centuries, was then spoken of. The various political changes and discoveries which took place from the twelfth to fifteenth century, and prepared the way for the gradual development of our present philosophical and medical system, were alluded to. The doctrines of the chemical and mathematical physicians, and of the vitalists of the seventeenth century were explained. The Lecturer concluded with some remarks upon the present state of medical science; observing, that in reference to the past, it might be described as a system of eclecticism, but as regards the principle upon which it was founded, it was a system of rational empiricism.

The second lecture will be delivered on Tuesday, February 11th, at 8 p.m. Subject, "The Action of Medicines and their Classifications."

The next monthly meeting of the members of the College, will take place on Tuesday evening, February 4th, at 8 o'clock, Mr. H. T. Kempton, F.L.S., in the chair. The subject for discussion will be "Caries of the Teeth" in continuation of Mr. Henry's paper, read at the last meeting.

ODONTOLOGICAL SOCIETY OF LONDON.

ANNIVERSARY MEETING, JANUARY 6th, 1862.

W. M. Bigg, Esq., President, in the chair.

The Anniversary meeting of the members of the Odontological Society was held on Monday evening, January 6th, 1862.

The meeting was occupied with the general business of the Society.

The report of the Library Committee was read and confirmed.

The **President** announced that Mr. Thomas Bell, F.R.S., having retired from the profession, the Council proposed that he be elected an honorary member of the Society.

The report of the Audit Committee on the Treasurer's financial statement was read, and the balance-sheet placed on the table for the inspection of the members.

Mr. **Harrison** presented his portrait to the Society, for which a vote of thanks was proposed, and passed unanimously.

An address of condolence was read, and directed to be presented to her Majesty, upon the severe bereavement which she has recently sustained.

The President, Vice-Presidents, Secretaries, and Officers for the ensuing year were then elected. John Tomes, Esq., F.R.S., was elected to the office of President.

The **President** having delivered an address on his retirement from office, a vote of thanks was proposed and unanimously passed to him for his able and courteous conduct during the past year.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

(From the 'Dental Cosmos' for January.)

A monthty meeting of the Association was held on the evening of December 10th, 1861, at eight o'clock.

President, Dr. T. L. **Buckingham**, in the Chair.

Present, Drs. Flagg, McQuillen, Dixon, Peirce, Fitch, Roberts, Barker, and the class of students in attendance at the Dental College.

The subject for discussion being

"The Causes and Treatment of Discoloured Teeth,"

was opened by Dr. **Barker**, who said, the most fruitful cause of discoloured teeth was to be found in the death and subsequent disintegration of the pulp, and that any influence that would produce this result, such, for instance, as mechanical injuries, exposure of pulp, from decay, periosteal irritation, the changes of temperature through a thin septum of dentine beneath a filling, improperly introduced amalgam and gold fillings, might all be classed as indirect causes inducing discolouration. As a general rule, the discolouration is more frequently seen in the anterior superior teeth.

In many cases the discolouration of teeth is more apparent than real, being due to the presence of decomposed and softened dentine in the cavity of decay and pulp canal, the living tissue having absorbed to some extent the organic matter of the devitalised pulp. A successful result of restoration to normal colour in such cases can be accomplished by opening into the pulp cavity, thoroughly washing out its contents, at the same time removing all dead matter from the crown and fang, cutting to some extent into the living healthy structure of the tooth.

The discolouration which results from the open-mouthed tubuli opening into the pulp cavity absorbing by endosmodic action the broken down and disintegrated blood corpuscles, the hematine of which produces the opacity, could, he thought, in many cases be removed by the judicious application of some of the chemical agents termed, perhaps erroneously, "bleachers." In his own hands chloride of lime combined with prepared chalk had been exceedingly successful.

Dr. **Dixon** said, his experience had been that teeth could not be restored to colour after they had become dark; he would confess that he had met with but little success in his efforts, and particularly with the chemical agents which had been so often recommended to the Profession.

Dr. **Fitch** said, as to treatment, the first necessary is to remove all foreign impacted matter from the pulp chamber and fang canals of the tooth. When the dentine has been mostly removed by decomposition, the tooth may be very much improved in colour by introducing at the time of filling some pliable white texture, such as tissue paper, between the enamel wall and gold. Many times by washing the interior of this class of teeth with the syringe and chlorinated soda in solution, or simple warm water, and then leaving their cavities open for a few days, their appearance will be materially improved.

Has been very successful with chlorinated lime, introduced into the cavity of the tooth to be bleached; usually saturates cotton in a strong solution, and allows it to remain twenty or twenty-four hours before examining its bleaching results. After such treatment, pursued a longer or shorter time, depending upon the peculiar conditions attending the individual case, teeth very much coloured have been restored to a complexion nearly approximating their healthy neighbours.

Dr. **Flagg** would desire in the first place to say, briefly, that he regarded discoloured teeth as divisible into two classes—1st. Those which had assumed a reddish or brownish hue from congestion of the pulp or peridentium. 2d. Those which had a bluish or blackish tint, resulting from putrescent pulps; tubular imbibition of extraneous colouring matter derived from food; or the former practice of filling pulp cavities and fang canals with pulverized charcoal, used on account of its antiseptic properties. Of the first class he would say that, in recent cases, after the practitioner had given vent to the undue collection and stagnation of blood, either within or without the affected tooth, by medicinal or mechanical means, Nature would generally effect a restoration to normal condition of the tooth substance as well as she would ecchymoma in other tissues; but thought it a hopeless task to undertake the "restoration" of such a tooth, if by long continuance its reddish colour had become "set." Would give as concisely as possible his usual treatment, merely stating that every case had its modifications, which any intelligent dentist could readily take cognizance of, and properly care for. When a tooth presented which belonged to his second class, he drilled into and washed out the pulp cavity if it were not open, and thoroughly cleansed and carefully stopped the opening if it were open, treating it *at first* as an ordinary case of entire exposure and dead pulp. After having gotten the tooth into condition to fill, with the sole exception of its yet being discoloured, he dried out the cavity and canal, and carefully introduced a small pledget of cotton, saturated with sol. gum sandarach, into the canal, passing it as well up as possible; this was for the purpose of preventing the passage or exfiltration of foreign substance through the apicial foramen. He then filled the interior of the tooth compactly with dry creta. preparata. pulv.; this was done by means of a sort of funnel or director, and a curved rammer, like a large-sized nerve-plugger, and the failure or success of the treatment depended very much upon the thoroughness of the packing. After a sufficient quantity had been introduced, he stopped the external cavity with a gum and cotton plug, *effectually excluding all moisture.* After allowing this to remain for three or four days it was removed, the tooth washed out, dried, and again well filled with the same. Would here remark, *en passant*, that before anything was done to such teeth, a matching "shade tooth" of porcelain should be selected, shown to the patient by the mirror, and placed aside for reference. These applications should be renewed at intervals of from two days to a week, until the desired colour was *almost* obtained, generally requiring from two weeks to three months, according to darkness of shade or length of its duration; and when that consummation was arrived at, he then applied dry chloride of lime in the same manner, allowing it to remain from one to five or six hours, producing a whiter shade than natural. When the tooth was plugged with gold the yellowness of the metal gave that slight tinge which, with undue whiteness, lent brilliancy and "life," such as could be obtained in no other way that he was aware of. Had used, in several cases where pulps had been destroyed by nitrate of silver, and teeth stained in consequence, the cyanide of potassium. Had also used sulph. ether, Labarraque's solution, aqua ammonia, chloride of sodium, &c., with varied results in particular cases; but found the most dependence to be placed upon the method and materials substantially described. Thought that, in cases where rapidly acting "bleachers" had been used, he had seen much return of discolouration, and thought it attributable to the disintegrating effect of substances used, rendering the substance more permeable to discolouring fluids. These were cases of thoroughly stained teeth, both in dentinal and enamel structure.

Dr. FITCH thought that the carbonate of lime in the form of chalk, mentioned by the previous speaker, is not, strictly speaking, a bleacher. Regarded it as acting upon the tooth in one of two ways: either as a desiccant, extracting all fluids whether of air, oily nature, or otherwise, from the tubular structure of the dentine, or itself being impacted in the tubuli, thus giving the tooth a whitened appearance.

Dr. MCQUILLEN remarked that he was disposed to regard the chloride of lime as a caustic. He was led to this inference by some experiments performed recently with Labarraque's solution, in which a number of teeth, that had been placed in the solution for a day or two, were considerably disorganized; and he had every reason to believe that the same result would supervene on subjecting teeth to the chloride of lime of equal strength.

In his efforts to improve the colour of teeth he had met with little or no success, He had been very much interested and edified, however, by the remarks of Dr. Flagg this evening, and should make renewed efforts, to be followed, he trusted, by more favourable results.

Dr. **Buckingham** said, the only advantage he could see from the use of chalk was, that it would absorb the oily matters present in the tooth, and, in this way, was doubtless beneficial. Chlorinated lime, on the other hand, possesses powerful bleaching properties. When perfectly saturated with chlorine it dissolves almost entirely in water, but, as ordinarily prepared, a large proportion is insoluble, consisting of hydrate of lime.

SOCIETY OF AUSTRIAN DENTISTS.

(From the 'Deutsche Vierteljahrsschrift für Zahnheilkunde' for January, 1862.)

In the summer of 1860, the following gentlemen, Messrs. Bernhart, Burger, Dollinger, Fleck, Fröhlich, Herbst, Heider, Jarisch and Melicher, took preparatory steps towards the founding of a Society of Austrian Dentists, and presented for approval a plan of the laws, drawn up by them, to the Ministry of the Interior. The plan received the approbation of his Majesty the Emperor on the 14th of April, 1861, and on the 2nd of August, of the same year, was confirmed by the Ministry of the State.

Based on these statutes, which essentially correspond with those of the Central Society of German Dentists, the Society of Austrian Dentists was formed, under the senior-presidency of Hr. Burger, on the 14th of November, 1861, at Vienna. The following gentlemen, Dr. Heider and Dr. Jarisch, were elected as Presidents; Dr. Fröhlich and Dr. Scheff as Secretaries.

The Chairman expressed the desire that the Society might at once start in the most practical direction, and that the centre of gravity of its existence might lay in the verbal transactions. The best means of furthering the objects of the Society, and promoting its increase and usefulness, were deliberated upon. Before the conclusion of the meeting, the Chairman drew the attention of the members to the production of leaf-gold, which was much neglected in Austria, large sums being sent abroad annually for this requisite. He proposed that, at the next meeting, the best method of drawing the attention of Austrian workmen to this daily-increasing necessity should be considered.

It was resolved that the Society should meet on the first Wednesday evening in every month, at six o'clock. The second meeting accordingly took place on the 4th of December. After a lengthy discussion, it was determined that the Society of Austrian Dentists should apply to the Trade Society, requesting it to direct the gold-beaters to turn their attention to the production of leaf-gold for stopping teeth, and specially to observe this material on visiting the London Industrial Exhibition. On this occasion, Hr. Dollinger made some interesting communications with reference to the distinguishing features of the different preparations of crystal-gold, and promised to demonstrate the same at the next meeting. Hr. Burger exhibited a tooth with necrosed fangs, presenting an extreme loss of substance through erosion, which excited general interest, more especially as neither pain, inflammatory symptoms, nor suppuration were experienced in connection with the tooth, a lower molar. The roots were firmly fixed, consequently the destruction of the affected pulp must have gone before. Some cases of absorption, and a plaster cast, showing a double row of teeth, exhibited by Hr. Bernhart, gave rise to a discussion on similar cases. The attention of the meeting was drawn to a suction-piece constructed in aluminium, and sent for inspection by Hr. Fricke, of Lüneburg. This specimen called forth a few observations from Hr. Dollinger, to the effect that he had also experimented with aluminium, but was not at all satisfied with it.

In the course of the meeting, a friendly feeling was expressed towards other Societies, and the Chairman was requested to offer the salutations of the meeting to the Society of Saxony and Hamburg.

A new and vigorous Society has thus originated, having for its object to elevate the status of the Dental Profession. From the earnestness already displayed, there is little doubt that success will attend its labours.

CORRESPONDENCE.

THE DENTITION OF THE ANDAMAN ISLANDERS.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—Professor Owen has lately directed the attention of the scientific world to the cranial and dental characters of the degraded race of savages inhabiting the Andaman Islands. The Andaman Islander is, perhaps, as low in the scale of civilisation as the African Bushman, or the aboriginal Australian. He is diminutive in stature, black, and quite innocent of all taste for dress. Even the women go completely naked. Before marriage, both sexes indulge in promiscuous intercourse, but after marriage the prerogative is retained by the males alone. They have no idea of a Supreme Being, of spirits, or of a future state. Their senses of sight and smell are marvellously acute; they can see to considerable depths in the sea, sufficiently well to shoot fish with their arrows. They are wonderful swimmers and divers, and rival the monkeys in climbing. Their weapons are bows and arrows and spears. They obtain their iron from wrecks cast on the sea shore, and with it they manufacture their arrow and spear-heads. Chips of glass got from the same source are used for the purposes of tattooing, shaving the scalp, and scarifying themselves in certain maladies. They possess the art of making wicker-baskets, spinning ropes, and manufacturing nets for catching turtle and fish. Thinking an account of the dentition of this curious people might be interesting to the readers of the Dental Review, I append the description given by Professor Owen at the Meeting of the British Association, September, 1861. I may add that neither in their dental or cranial characteristics do they appear to diverge from the human standard.

"The teeth equal in size the average of those of Indo-Europeans; they correspond in this respect with those of the European figured in the authors Odontography, plates 118 and 119. Although they are large in proportion to the size of the jaws, they are markedly smaller than are those of the Australian figured in the same plates. In the upper jaw of the male Andamaner, the true molars, as in most Europeans, diminish in size from the first to the third. The fissure which penetrates the grinding surface from the outer side to the middle of the crown, had its end unobliterated in *m* 1, and retained its whole length in *m* 2. The enamel was worn from the inner half in both teeth, but in a less proportion in *m* 2; it was also slightly worn from the outer tubercles in *m* 1. The degree of abrasion of the teeth, according to the age of the individual, is such as might be expected from the mastication of a diet consisting chiefly of fish and fruit. In the lower jaw the dentine is exposed on the three outer tubercles of *m* 1; the crucial figure is not obliterated in *m* 2; *m* 3 is larger, as usual, than the corresponding tooth above. The upper premolars are implanted by a fang which is divided at its base into an outer and an inner root. The undivided fang of the lower premolars is longitudinally grooved on the outer side. In the upper jaw, *m* 1 and *m* 2 are implanted by two outer and one inner roots; *m* 3 by one antero-external and one postero-internal root. All the lower molars have distinct anterior and posterior roots. There was no irregularity in the position, nor any sign of decay in the teeth." I am, Sir, yours, &c. F. L. S.

CHLOROFORM IN DENTISTRY.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—The case of the patient with diseased "stump," to be removed under choloroform, described by Mr. Hasler Harris, of Gower street, in the last number of your talented Review, is a very interesting one, but easily to be explained; the sensibility of the conjunctival membrane of the eye, on which we so much depend as a test when administering choloroform, is due chiefly to reflex action of a somewhat complex nature; but the point of interest is this—if, in testing the eyes, this membrane is rubbed six or eight times in the *same* eye, the reflex action is exhausted; this eye, in fact, seems insensible when it is not so, while the opposite eye gives indications exactly correct. In my book on Chloroform, I have dwelt especially on this, and the fact that persons of a hysteric or excitable disposition, as correctly stated by Mr. H. Harris, are much less yielding to the influence of chloroform than other patients; it is also quite possible that the irritation of the stumps, acting on the fifth pair of nerves, in Mr. Harris's case, may also have increased the irritability of the conjunctiva of one side (the right), whilst the other was acted on as just explained. I think if I had seen the case, I could have explained it; for, in addition to these phenomena, it is now found we may have contraction of the pupil, too, on one side from such irritation, or spasm, of this selfsame fifth nerve (not the third as previously believed); in fact, I have more than once seen a "pin hole pupil" as the result of irritation of this kind, suddenly—in an instant—become a largely dilated pupil when the irritation was suddenly removed, as by extinction of a bad fang or stump, and the nerves supplying the iris and conjunctiva, lenticular ganglion, &c., are, *quo ad* chloroform, nearly the same. A patient may even have very dilated pupil of one eye alone, according to the manner in which he reclines in a dentist's chair, from the gravitation of the normal fluid in the ventricles of the brain. Yours, &c.,

Charles Kidd, M.D.

Sackville street, Piccadilly, Jan. 4.

P.S.—Perhaps you would allow me, *currente calamo*, to say a few words here as to the very disagreeable trial of a dentist recently, at Liverool, for alleged seduction of a young woman under chloroform. It was there stated that chloroform has a tendency to excite sexual passion, and that patients under the hands of dentists, when narcotised, are generally found to talk in an obscene manner: this has gone the rounds of all the newspapers in Europe, still it is most decidedly untrue. I have steadily watched over ten thousand cases of chloroform administration, and I have not, in a single instance, heard obscene talk on what was referred to at that wretched trial. The idea originated with a dream of Dr. Ramsbotham, and some books published by Mr. Churchill, of New Burlington street; but it is now denied strongly in America, and by all the best men in Paris, Vienna, and London, nor will the weekly journals allow it to be corrected, to the undeserved and enormous injury of the respectable men of the dental profession.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—From the tenor of the reviewer's favourable notice of my work in the 'Dental Review' of January, I feel it incumbent upon me to ask your insertion of a line or two upon the origin of the book.

It was printed in order to supply a want evidently existing in the Dental Profession,—viz., of some condensed work upon *General Metallurgy*, which should include all the metals useful or likely to be used by the Dentist; such want being evidenced by the inquiry made by my class, for some work as a fitting text book upon the subject.

Being a practical Metallurgist, and not a Dentist, I therefore confined myself entirely to the general treatment of the metals and their ores, leaving the application of principles to be made by those whose daily occupation renders them most capable of assimilating such facts.

Touching one just requirement of the review, I may say that the composition and character of each available amalgamation will be found under the head of "alloys" of each metal in order; and that some general remarks upon their electrical bearings will be found in the chapter on electro-metallurgy. In conclusion, the author freely admits that "specialities" have been very carefully and sparingly touched upon by him, as he believed his wisest course was to furnish rather good substrata upon which the details required in actual practice are really based.

I remain, yours obediently, G. H. MAKINS.

MISCELLANEOUS.

CONDITION OF THE MOUTH IN IDIOCY.—*Palate*: Amongst the 200 cases included in this inquiry, 82 possessed palates inordinately arched, and with this increased arching were noticed various abormalities. In some the palate was unsymmetrical, the two sides having different degrees of concavity, or one side plane, and the other concave. In 34 the palates were excessively arched, approximating to the appearance of the roof of a house, and, with this extreme angularity, was great narrowness. Excessive arching of the palate occurred, therefore, in 58 per cent. Excessive flattening of the palate was observed in 4 cases. In 34 cases, or 17 per cent., the palate had a very prominent antero posterior ridge or keel, corresponding to the line of approximation of the palatal bones. In 7 the palate bones did not meet, leaving a sulcus between them, the mucous membrane being, however, continuous. There was no instance of the ordinary cleft palate, and I may remark that in an examination of nearly 600 idiots, I have failed in meeting with an example of that deformity. In several the hard palate extended but a short distance posteriorly, from defect of the palatal process of the superior maxillary bone and entire absence of the palatal process of the palate bone, and in all these cases the velum-palati was unusually flaccid. In the majority of cases there was marked narrowness of the palate. The table at the commencement of the following page represents the measurements, in 24ths of an inch of the space between the posterior bicuspid teeth of opposite sides.

No.		Distance. In.		No.		Distance. In.		No.		Distance. In.
2	at	$\frac{16}{24}$	...	11	at	$\frac{23}{24}$	...	13	at	$1\frac{5}{24}$
1	,,	$\frac{18}{24}$	...	24	,,	1	...	9	,,	$1\frac{6}{24}$
3	,,	$\frac{19}{24}$	...	37	,,	$1\frac{1}{24}$	...	1	,,	$1\frac{7}{24}$
2	,,	$\frac{20}{24}$	...	25	,,	$1\frac{2}{24}$	...	5	,,	$1\frac{8}{24}$
13	,,	$\frac{21}{24}$	...	23	,,	$1\frac{3}{24}$	...	3	,,	$1\frac{12}{24}$
10	,,	$\frac{22}{24}$	...	17	,,	$1\frac{4}{24}$	...	1	,,	$1\frac{22}{24}$

It will be observed that 33 per cent. do not exceed 1 inch, and that 62 per cent., while being more than 1 inch, do not exceed $1\frac{1}{4}$ inch; whereas the normal average has been stated to be $1\frac{1}{2}$ inch. It is worthy of notice that these numbers hold no direct relation to the age or stature of the patients examined. Thus, in a youth 22 years of age and 6 ft. 1 in. in height, so narrow is the palate that there is only 1 $\frac{2}{24}$ inch between the bicuspids, and only $\frac{10}{24}$ inch between the opposite gums at their widest interval. The lowest measurements occurred in a boy and girl, the boy 12 and the girl 13 years of age. Neither is there a direct relation between the width of the palate and the cranial capacity; for in a microcephal, whose palate was $\frac{22}{24}$ inch wide, the internal canthi of the eyes were $\frac{23}{24}$ inch distant from one another; while in a macrocephal whose palate was $\frac{23}{24}$ inch wide, the distance between the internal canthi amounted to 2 inches.—*Teeth:* The principal characteristics of the teeth in idiots are, that the period of the first dentition is delayed, the second dentition considerably postponed, and that they undergo very general and rapid decay. In many cases the anterior surface of the incisors presents a honeycombed appearance, but in no one instance have I observed those special characters which have been well shown by Mr. Hutchinson to be significant of congenital syphilis. In a large number of cases they are developed irregularly, are crowded, and the canine occupy a different plane from the other teeth,—all these irregularities resulting from the imperfect development of the superior maxillary bone. In 6 cases, or 3 per cent., the upper incisors projected to such an extreme degree as to produce grave deformity. In 7 cases the teeth of the lower jaw were in advance of those of the upper.—*Condition of the Palate and Teeth in Idiocy,* by J. Langdon H. Down. M.D—*Lancet,* Jan. 18, 1862.

On the Adulteration of Tin Foil, by Mr. J. H. Baldock.—Having occasion a short time back to prepare some compounds of tin, I employed for the purpose, in the absence of granulated metal, some tin foil, and was surprised to find my product very largely contaminated with some other metal. Upon careful examination of the tin foil which I had used, I found it to contain a large amount of lead. Believing that the presence of this metal in such considerable quantity in the foil is not generally known and recognised, I obtained a number of specimens of commercial foil and submitted them to analysis. Some of these were kindly supplied to me by Mr. Haselden, of Conduit street, the remainder being collected by myself. They consisted of—1. Ordinary commercial foil; 2. Embossed foil; 3. Tinned paper; and 4. Foil lining the packets of Horniman's tea; together with a sample of "Pure Tin Foil" from Mr. Saddington's, and some of Betts' Patent Capsules. The following table of the results of the analysis in the several cases will show the proportion of lead and tin present in the different samples. The processes employed will be subsequently described.

	1	2	4	Pure Foil.	Bett's Capsules.
Lead	86·93	76·57	88·655	34·375	84·56
Tin	13·06	23.42	11·345	65·625	15·46
	99·99	99.99	100·000	100·000	100·02

It thus appears that tin foil is such only in name, though the reason of this large admixture of lead is not very apparent, because the so-called pure foil noticed above, which contains a much smaller proportion of lead, appears to be in every respect better suited to general requirements, being at once thinner, lighter, and tougher. The only cause that I can assign is, that the alloy may be more easily rolled than the pure metal. I may remark that the sp. gr. of the alloy is less than would be indicated by calculation from the sp. gr. of the two metals. In Gmelin's Work a table is given, showing the actual and calculated specific gravities of these two metals when alloyed in different proportions.—*Pharmaceutical Journal.*

HEREDITARY TENDENCIES.—"You will often be able to notice in large families how varieties of diathetic states arise from a common constitutional predisposition. For example, in a family derived from gouty parents, I have noticed in one a well-marked arthritic diathesis ; in another a neuro-arthritic, *i.e.*, nervous tendencies and symptoms predominating ; in a third a strumous arthritic, or the physiognomy of strumous with gouty tendencies. In the two Hunters you have an illustration of this general fact. William Hunter was a well-marked example of the nervous temperament and gouty diathesis (neuro-arthritic. His smart dapper person, small limbs, small mobile features, thin alæ nasi and lips, are very characteristic, as well as his active habits and power of continuous mental labour. Although exceedingly temperate, at 60 he was a martyr to the gout, and died of hemiplegia, or some form of cerebral paralysis, at 64. John Hunter (the brother of William, and the youngest of fourteen children), was of the strumous arthritic diathesis, with a nervous element also ; but in him the gouty tendency resulted in atheroma as well as gout. He died, in short, of angina pectoris, a disease of the heart very commonly manifested in men of his diathesis, and associated in such with atheroma of the coronary arteries, as in his case. He had, in short, what may be termed strumous gouty degeneration of the arterial tissues. His florid complexion indicated the vascular element, while his rounded forehead, thickened alæ nasi, thick upper lip, and carious teeth in the upper jaw marked the strumous tendency. In these family differences as to the diathetic tendencies of the children, it is not difficult to trace the influence of morbid states of the parents at the time of conception. It is constantly seen in parents with a syphilitic taint in the varying vigour of children born in succession. The children of old men are often strumous. John Hunter, it is clear, owed his strumous arthritic diathesis to the circumstance that his father was in his 70th year when John was conceived, and had at least one of the diseases of the gouty habit, namely "gravel." And although great care was taken of John Hunter's health when young, yet he was threatened with pulmonary tuberculosis at manhood, had gout in midde life, andobesity and extensive atheroma of the cerebral as well as caronary arteries in the decline of life. He was a typical man of his diathesis ; with a predisposition to tuberculosis and atheroma ; he, nevertheless, from the vigorous nutrition of his nervous system, was capable of great mental labour."—*Physiognomical Diagnosis of Disease*, by T. Laycock, M.D.—*Medical Times and Gazette*, January 18th, 1862.

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

All communications are requested to be addressed to Mr. JOHN W. DAVIES, 54 Princes street, Leicester square, the present Publisher of the Journal.

BOOKS RECEIVED IN EXCHANGE.

Dental Cosmos for January.
Dental Register of the West for December.
Pharmaceutical Journal for January.

Communications have been received from Dr. Kidd, H., Mr. Williams, and from F. L. S. Mr Ward's letter will appear in our next number.

THE

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A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

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J. H. McQUILLEN, D.D.S.
GEO. J. ZIEGLER, M.D.

Observe, Compare, Reflect, Record.

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CONTENTS OF VOL. I.

ORIGINAL COMMUNICATIONS.

PAGE.
A NEW ALLOY 638
Absorption of the Fangs of the Deciduous Teeth 517, 563
Advantages of a Full Supply of Dental Material 462
Alloy of Platinum with Iridium 352
Alveolar Abscess arising from Exostosis 72
Alveolar Hæmorrhage 297
Amalgam Fillings 122
American Dental Association 619
Another Amalgam 351
Approximal Cavities 294
Bicuspid Roots 242
Brushing Teeth 171, 227
Case of Irregularity 60
Coloring Matter for Porcelain 176
Constitutional Causes of Dental Caries 173
Correspondence — Letter from P. Calais 18
Creosote and Cotton in Fang Filling 115
Deciduous Teeth 10
Deciduous Teeth at Twenty Years 303
Dental Anomalies 229, 283, 340, 398, 451
Double Tooth 515
Effects of Disease on the Teeth 566, 622
Electrical Anæsthesia in Dental Operations 177
Electrical Anæsthesia in Surgical Operations 300, 350
Expanding of the Jaw 281
Expansion of Plaster of Paris 117
Exposed Nerves 244
Extracting Teeth 626
Extraction of Deciduous Teeth to Prevent Irregularities 68
Facial Neuralgia produced by Indigestion 11
Fang Filling 296
Filling Teeth over Exposed Nerves 349
Filling Teeth with Osteoplastic 636
Finishing Plate Work 243
Force of Expansion of Plaster of Paris 238
Fungoid Growth of the Gums and Jaw 459
History of a Lateral 457

PAGE.
Inflammation 289, 337
Interesting Case 124
Intra-Uterine Influences 177
Ligamentum Dentis 516
Malpractice met with and treated 346
Moulding for Metallic Casts 517
New Method of Making Dies 570
New Mode of Preparing Dies for Suction Plates 506
Nodular Calcification of the Dentinal Pulp 343
Obituary—Dr. David Stickney 72
Os Artificial Fillings 573
Os Artificial Fillings 637
Osteoplastic 514
Osteoplastic Filling 348
Our Enterprise 1
Painless Extraction of Teeth 514
Pearson's Osteoplastic 300
Plaster Impressions 464
Plastic Fillings 465
Plastic Material for Cements, Lutes, Temporary Fillings, etc 631
Posterior Bicuspids, Where are They? 465
Practical Dentistry 621
Practical Hints 4, 57, 169, 225, 393, 449, 505, 561, 618
Preparing Mouths for Artificial Teeth 513
Preservation of Deciduous Teeth 6
Profession in England 120, 304, 404
Publishers' Notice 617
Regulating the Natural Denture 113
Sensitive Dentine 394
Separating Teeth by Mechanical Pressure 236, 300
Singular Case 303
Spontaneous Necrosis of the Alveolar Process 13
Sudden Formation of Cataract in both Eyes 14
Swallowing a Set of Teeth 407
Tempering Excavators 70
To Solder without Warping the Plate 461
Treatment of Sensitive Dentine 510
What are our Dentifrices? 240
Zinc Dies 460

PROCEEDINGS OF DENTAL SOCIETIES.

PAGE.

Alumni of the Pennsylvania College of Dental Surgery 479
American Dental Convention 79
Baltimore College of Dental Surgery 480
Dental Commencement 477
Georgia Dental Society 89
Indiana State Dental Association. 189, 417
Kentucky State Dental Association 584
Michigan Dental Association 250, 361
National Delegate Convention 73
New York State Dental Association. 133
New York State Dental Convention. 56
Northern Ohio Dental Association. 480, 585
Pennsylvania Association of Dental Surgeons 15, 126, 179, 245, 354, 407, 466, 522, 575, 639
Pittsburg Dental Society 18

EDITORIAL.

PAGE.

American Dental Association 138
Claims of the Profession 482
Convention of Delegates at Niagara. 91
Dental Education 650
Dental Journals 135, 308
Dental News Letter 21
Dental Register on Practical Hints 532
Division of Labor 90
Expressing Opinion 481, 589
Fees for Professional Services 251
Individual and Associated Effort 22
Lancing Gums in Extracting Teeth 362
National Dental Convention 590
Obituary—Drs. Allen and Waid 419
Picking out Plugs 306
Plans that have been tried as the Basis of National Dental Associations 191
Professional Discussions 253
Reformatory Movement in England. 363
Renovation of Old Clay Crucibles 534
Sensitive Teeth 190
Serum in Pulp Cavities 193
Taft's Operative Dentistry 586
To Correspondents 139, 418
Westcott, Prof. A. 534
Wright, Dr. Wm. A. 254

REVIEW OF DENTAL LITERATURE AND ART.

PAGE.

Advice to a Student of Mechanical Dentistry 489
Alveolar Hæmorrhage 95, 376
American Dental Association 320
American Dental Review 320
Anæsthesia by Compression of the Carotids 263
Chloride of Zinc 35
Death from Chloroform 201
Death from the Administration of Whisky 491
Dental Fees 260
Dental Quackery 151
Dentistry in France 205
Dictionary of the English Language, Worcester 537
Diet and Modes of Life in their Influence on the Organs of Mastication 255
Electricity as an Anæsthetic in Dental Operations 142
Exactitude of Science 535
Exostosis 428
Extract of a Letter from Dr. Mackenzie 371
Fang Filling 32
Fang Filling—Permeability of Tissue 140
Galvanism 28
Hypnotism 368
Inaugural Address 489
London Medical Registration Association 206
Malignant Diseases Involving the Organs of Mastication 145
Maynard's Method of Extirpating the Pulp 312
Medical History and Treatment of Diseases of the Teeth and Adjacent Parts 591
Methods of Study 318
Metropolitan School of Dental Science 368
Narcotic Remedial Series, their Action and Application 315
Natatorium and Physical Institute 652
N. Y. Society of Dental Surgeons 663
Obituary—Dr. Alvan Blakesly 664
Odontological Society 656
Odontological Society; Essay on the Structure and Adaptation of the Teeth 372, 423
Odontology 36

PAGE.
Oval Mouth Glasses ... 264
Owen, Professor ... 93
Partial Impressions in Plaster ... 661
Profession in England ... 28
Purple of Cassius ... 313
Pus ... 29
Solution of Perchloride of Iron ... 664
Southern Dental Examiner ... 593
Taft's Operative Dentistry ... 139, 194
Teeth united to Plate by Means of Amalgam ... 35
Title of Surgeon-Dentist ... 202
To Sharpen Files and Burr Drills ... 262
Transudation of the Liquor Sanguinis ... 365, 420
Treatment of Irregularity of the Permanent or Adult Teeth ... 540, 599
Treatment of Periostitis and Alveolar Hæmorrhage ... 31
Treatment of recently exposed Nerves with Nitric Acid ... 98
Tomes's Dental Surgery ... 139, 484
Two Conventions ... 26
Wells, Dr., the Discoverer of Anæsthesia ... 594
Wisdom Teeth ... 311

PERISCOPE OF MEDICAL AND GENERAL SCIENCE.

PAGE.
Action of Hypochlorite of Lime on Sulphur, and the Employment of a Mixture of these Bodies for the Vulcanization of India-rubber ... 670
Adventitious Odontogeny ... 107, 606
Alkalized India-rubber ... 331
Alloys of Alumi[illegible] ... 163
Alloy of Steel ... 160
Anæsthetic Effects of Bisulphate of Carbon ... 157
Are Men and Monkeys Similar? ... 54
Black Oxide of Copper in Loose Teeth ... 162
Buccal Cancer among Smokers ... 217
Caries of the Teeth caused by External Agents ... 213
Cases connected with the Teeth ... 49
Case of Chromidrosis ... 271
Case of Dropsy of the Antrum ... 161
Case of Fracture of the Upper Jaw Bones ... 383
Case of Morbid Growth of the Gums. 439
Case of Severing the Orbicularis Oris Muscle, in Dental Surgery ... 610
Cause of Color of Venous Blood ... 48
Causes of Death after the Removal of the Point-Vital of the Medulla Oblongata ... 102
Cell Life ... 208
Cements ... 269
Chemistry of Caustics ... 152
Chronometry of Life ... 496
Classification and Geographical Distribution of the Mammalia ... 100
Cleansing Glass and Porcelain Vessels ... 273
College of Dentists in England ... 497
Coloring the Lips, by Tattooing after Cheiloplasty ... 156
Complicated Double Hare-Lip ... 157
Contributions to Dental Pathology .. 382
Decline and Evils of Homœopathy .. 212
Dental Anomaly ... 604
Development of the Teeth of Cattle, and Mode of ascertaining their Age by the same ... 673
Difficult Deglutition ... 102
Discoloration of the Skin and Mucous Membrane, by Nitrate of Silver ... 108
Disease of the Alveolus and Antrum. 554
Double-Headed Pig ... 388
Electric Light applied to Surgery ... 550
Empirical and Scientific Art ... 210
Enormous Ranula ... 219
Ethnology ... 329
Etiology of Human Degeneration ... 40
Experimental Pathology and Operative Physiology ... 492
Experimental Researches on the Artificial Production of Bone ... 46
Facial Neuralgia ... 269
Failure of Hypnotism ... 387
Final Causes ... 553
Fourth Kingdom of Nature ... 158
Galvanoplasty ... 331
Hare-Lip ... 384
Heat-conducting Power of Metals ... 159
Hypodermic Treatment of Diseases. 105
Idiosyncrasies ... 273
India-rubber for the Making of Artificial Gums and Palates ... 669
India-rubber Tools ... 218
Influence of Electricity over the Nervous System ... 104
Influence of Nervous System over Secretion ... 162
Interstitial Keratitis with Teeth of the Heredito-Syphilitic Type ... 671
Intimate Structure and Functions of the Brain and Spinal Cord of Man and other Vertebrata ... 101
Long Preservation of Human Teeth. 161
Martyrs of the Age ... 107
Metropolitan School of Dental Science ... 441
Mixed Polypus of the Nose and Antrum ... 328
Morbid Influence of the Nervous System ... 218
Narcotic Injections in Neuralgia ... 55
Neuralgia ... 267

PAGE.
Neuralgia Faciei 438
Neuralgic Dysmenorrhœa 158
Necrosis from Phosphorus 273
Nervous System on the Parotid Secretion, on the Influence of the... 601
New Amalgam for Plugging Teeth .. 160
New Cement for the Teeth 162
Nitrous Oxide, its Properties and Applications 665
Notes on Electro-Metallurgy 154
Notes upon the Variable Quantities of Electricity necessary to excite Properties of the Various Tissues. 271
Obstinate Chronic Discharge from Nostril 48
Odontocele 548
Odontography 433
Operations for Neuralgic Affections. 378
Operations under Hypnotism in Paris. 381
Organic Tension 103
Ossification in Cartilages 386
Osteogenic Properties of the Periosteum. 547
Paleontology 109
Parthenogenesis 607
Patent Wood 332
Pathological Laws of Nervous System 102
Pathology and Treatment of Idiopathic Peripheral Neuralgia 377
Personal Appearances Improved by Operation 385
Phosphor-Necrosis 326
Pocket Electro-Medical Apparatus.. 331
Polishing Metals 160
Porcelain Kilns 331
Precipitation of one Metal by Another 326
Preparation of Aluminum 271
Professional Honorarium in France. 385
Purification of Gold 609
Regeneration of Nerves 323
Relative Effects of Experiments upon Different Animals 330
Report of Clinical Hospital, Manchester 42
Reproduction of Bone 548
Researches on the Diseases among the Laborers in the Mercury Mines of Idria 272
Results of Practical Schooling 385
Return of Sensibility after Section of Nerves 674
Salivary Calculus 162

PAGE.
Salivary Fistula 383
Salutatory 40
Scientific *versus* Practical Instruction 552
Set of False Teeth in the Œsophagus Fifteen Days 382
Solder for Aluminum 163
Solid Perchloride of Iron as a Styptic 270
Solubility of Alkaloids in Chloroform 109
Solubility of Silica in Hydrochlorated Alcohol 330
Soluble Glass 550
Some of the Accidents produced by the Development of the Wisdom Teeth 323
Some of the Evil Effects produced by Retaining Carious Teeth and Stumps in the Jaw 545
Spinal Cord 327
Spontaneous Ptyalism prevailing as an Epidemic 552
Spurious Gold 608
Stomatitis Materna 158
Stomatorrhœa Vicarious to the Menses 269
Structure and Relations of the Nervous System at the Periphery 265, 321
Study of the Parotid Gland.. 666
Subcutaneous Injections of Medicines 216
Submucous Injection as a Cure for the Toothache of Pregnancy 214
Sympathetic Odontalgia 108
Sympathy of Nerves 219
The Gorilla—A Natural Curiosity... 108
Tobacco 157
Traumatic Lesions of Nerves 268
Treatment of Nævus 272
Treatment of Odontalgia in Pregnancy 53
Tumor of the Lower Jaw 325
University of Brussels 325
Unusual Nervous Phenomena 51
Voltaic Narcotism 104, 551
What is Glandular Secretion? 381
Wisconsin Bones 272
Zeiodelite 610
MISCELLANY 55, 109, 164, 220, 275, 332, 388, 441, 498, 555, 611, 675
BIBLIOGRAPHICAL 224, 279, 336, 392, 446, 503, 560, 616, 680

THE

DENTAL COSMOS.

NEW SERIES.

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ORIGINAL COMMUNICATIONS.

PUBLISHERS' NOTICE.

This number closes the first volume of the Dental Cosmos. We commenced its publication with the determination to make it the leading exponent of Dental Science and Art, and from the abundant assurances of gratification and approval which we have received from a very large number of those well qualified to judge, both in and out of the profession, believe that we have succeeded to a very great extent.

Our journal has already attained such a position, that we feel justified in claiming it to be the representative of the Science and Art of Dentistry. No effort will be spared to maintain and increase its present practical efficiency, and to render it a true exponent of everything of importance connected with the theory or practice of Dentistry. We hope thus to make it indispensable to every one engaged in the special department of Dentistry, as well as to many who are more exclusively interested in general medicine.

The plan of separate departments upon which it was established, and has been conducted, has worked so well, that it will be continued.

The unprecedented success of this journal has established two facts to our entire satisfaction, viz.: First, that a good monthly dental periodical is required, and will be sustained; and secondly, that for its proper support, the cash system is absolutely necessary. We shall therefore adhere to the system of *cash payments in advance;* for, apart from the fact that neither publishers nor editors, any more than printers, dental practitioners, or workers in any other department of life, can be expected to labor without adequate compensation, the interests of subscribers as well as the profession in general are advanced by this practical encouragement to increased effort in promoting the greater usefulness of the journal.

In order to secure an extensive circulation, the annual subscription price is put at such a low figure, that it cannot prove a tax to any one, and is really insignificant when compared with the advantages to be derived from the constant supply of reliable information upon all the most important matters relating to the theory and practice of Dentistry—information as essential to the success of the practitioner as a proper supply of material for professional manipulations.

During the progress of the volume, we have sent copies occasionally to others than subscribers, in order to afford them an opportunity of ascertaining its character and value. We shall not deem it necessary to pursue this plan further, and therefore invite all who desire to receive it, to send their names and subscription price at once. As the size of the edition will depend upon the number of subscriptions received, a *prompt* response is desired. We wish it to be understood that the Dental Cosmos will be sent regularly to those only who pay in advance.

We earnestly invite the support and co-operation of all who recognize in this journal a means of improvement to themselves, or of elevation to the profession in general.

Jones & White.

PRACTICAL HINTS.

BY J. D. WHITE.

Plugging teeth over slightly exposed nerves, or where there is only a thin plate of dentine covering them, seems at present, from what we see in the journals and discussions before societies, to be quite a settled practice with many in the profession. For more than twenty years we have regarded the practice as unsound, and for as long a time have condemned it, and exerted all our care to avoid plugging over a slight exposure or where the plate of dentine was not thick enough to sustain the life of that portion of the pulp that it was destined to protect. The *liquor sanguinis* supports the vitality of dentine, and when the greater part of the dentine is supplied over any portion of the pulp by a foreign substance, such as a plug of any metal, a *stagnation* takes place between this plug and the pulp, and the thin portion of dentine becomes morbid from an undue amount of nutritive fluid poured into it, the circulation of which has been arrested by the plug which may be less permeable than the dentine. If there be a considerable partition of dentine intervening, a pulp may *live* without any signs of trouble to the patient, and the slow and normal process of the receding of the pulp, as age advances, may take place by the filling up of the pulp cavity, and the case may be a success for the life of the patient. But if this plate be *too thin*, and by this too thin we mean that according to the capacity of the pulp and the constitution of the patient to successfully sustain morbid action, the case will fail. The stagnated fluids in this portion of dentine ends in decomposing it, leaving an opening between the plug and the pulp or causing a loss of its vitality; in either case inflammation of the pulp is the consequence, and the plug must be removed, and the case treated as if it had been exposed before plugging. We never get into any trouble from this near approach to a pulp, unless it be where we err in our judgment as to the capacity of the pulp to live with a small amount of its natural protection; but we do not destroy a pulp unless we can decide that there is an actual exposure, even though the success of the case may be doubtful; we prefer to give the patient the advantage of that doubt.

We frequently treat such cases with creosote or tannic acid and sulph. morphia, to reduce the action of the pulp for a time after the tooth is plugged, and to compensate for the irritating influences of the jarring the tooth undergoes by the operation; but we are not always successful under what we regard at the time as favorable circumstances. The function of the pulp is to supply nutrition to the crown of the tooth above the gum, as the anatomical arrangement of the tubuli indicate, and the constituents of the circulating fluids to the crown of a tooth is equal to the wants of that substance, as is true of any other tissue of the body; and how our modern physiologists provoke the pulp to produce more of one constituent than another, seems to us to be too absurd for serious consideration. We have always been taught and believed that to increase the action of an organ or a tissue, that an excess of the fluids was the result of that increased action instead of the solids. How to approach a pulp of a tooth by *therapeutic agents*, so as to procure a rapid deposit of dentine or bony matter, and reduce the vascular and nervous tissue of the pulp at the same time, is beyond our comprehension. If the earthy constituents are increased, the animal constituents and fluids are increased also, and, as far as we can judge in treating teeth, where the pulp is irritated or increased in its action, this is true. "*Ubi irritatio ibi fluxus*" is, we believe, sound doctrine. Upon removing a plug for pain in a tooth, when the pulp is living or a recent case of irritation, a small portion of serum will be found between the plug and the pulp, and if it be a case where intense pain has been experienced, it frequently happens that pus and blood will also be found, the accumulation of which will have compressed the pulp so that the orifice of exposure can be entered without touching the pulp, but in a few minutes after the discharge of the pus or serum, the pulp will regain its normal size and fill its cavity, and the pain will cease, which had been caused by the pressure; hence the relief that is obtained by giving "vent," as it is termed.

(To be continued.)

AMERICAN DENTAL ASSOCIATION.

BY GEO. T. BARKER, D.D.S.

A WRITER, under the initials E. T., in the June number of the *Dental Register*, in reviewing the plan of organization submitted for the proposed Association, comments upon the action of the committee in discharging their duty, in a manner which, to those unfamiliar with the entire subject, is calculated to place them in an invidious position before the profession.

In presenting their report, the committee offered a preamble, of which the following is an extract:—

"A due regard for our own reputation, as well as a just appreciation of the rights of others, makes it obligatory that we should *state, and desire* the same to be *placed upon record*, that the plan of organization we submit to you is based upon a constitution that was framed by some of the brightest and best minds of our country—we refer to the American Medical Association."

When taking into consideration the fact that the above honest and candid statement was made with the desire that the committee should be relieved from the slightest imputation of appropriating the labors of others without making a due acknowledgment of the same, one might have supposed that such candor would have excited a feeling of respect rather than have induced the unjust censure contained in the following extract from E. T.'s remarks:—

"When such a committee has more labor assigned to it than can be properly performed in the stipulated time, it becomes necessary to slight the work or to *copy* the plan of some other society, unless one of its members has a 'cut-and-dried' article ready for presentation, which would be a fortunate arrangement, if these ever-willing *cut-and-dry* souls were always as competent as they fancy themselves."

The plan presented by the committee, though *based* upon that of the American Medical Association, is not a copy of that instrument, but a *condensation* and *modification*, to a great extent, of that valuable document; and, furthermore, in the part essentially making it a constitution for a dental organization, though no claim to such was advanced by the committee, it is truly and emphatically original.

No attempt was made to force the plan upon the Convention, for the original resolution presented, at the first meeting, was as follows:—

"*Resolved*, That a committee of *one member from each delegation present* be appointed to draft a constitution and submit the same to this Convention, its final adoption to be left until the next annual meeting."

With regard to "cut-and-dry" constitutions, I can say, as the result of positive personal knowledge, that so far as the mere mechanical operation of writing out the document was concerned, it *was performed at Niagara*, and that in the discharge of that duty, no attractions, however great, were sufficient to divert attention from it. Though drawn up there, the plan, it is true, was not the result of the hasty deliberations of the moment, but the calm reflection of a considerable period previous to presentation.

The objections urged by E. T. to the proposed plan, I shall not attempt to refute, as he has an undoubted right to his own opinions, though it would seem in many of them, *wit* is more aimed at than honest and serious opposition. What, I might ask, would be the value of a constitution that did not define the duties of officers and committees? And as every one who may be elected to a position in the Association may not be as familiar with *"parliamentary usage"* as E. T., they, as a natural consequence, must look to the constitution for instruction as to their duties, and would remark, that after an experience gained in several organizations, is convinced much loss is sustained by the neglect on the part of associations to define the duty of every officer fully and clearly in the constitution.

I will conclude with a reference to the following quotation: "Our brethren across the water sometimes allude to American verbosity. Shall we afford them so strong an occasion to do so again?" This charge falls to the ground when it is known that the proposed plan is half the length of the constitution of the American Medical Association, and one-third that of the Odontological Society of London. Though there are portions of the proposed plan of organization open to objection, the acknowledgments made by the committee, that they could not but believe there were imperfections which the deliberations of the Convention would correct, should at least have preserved them from so ungenerous an attack.

PRACTICAL DENTISTRY.

BY J. FOSTER FLAGG, D.D.S.

THE few remarks which I am about presenting in relation to this subject, I propose shall be in the form of an embodiment of reflections resulting from the perusal of a communication under the same title in the April number of the *Am. Journ. of Dental Science*, from the pen of one of the best theoretically educated dentists in our country, a gentleman whose acquirements are of that order which commands the respect of his equals and the admiration of his inferiors, and whose sentiments are, from this fact, entitled to more than ordinary consideration as opinions of much weight in relation to matters with which, notwithstanding the much talked of advancement of our profession, there are comparatively few members more than tolerably conversant. That one so well informed, as is the author of that paper, should admit the value of that general knowledge of "anatomy, physiology, pathology, and the nature and application of remedies," upon the *absolute necessity* of which the intelligent practitioner of dentistry bases the claim of his avocation to rank as a "profession," is nothing more than would have been expected, but that the same gentleman should regard for a moment the possibility of increased dental enlightenment tending to deteriorate the practical manipulations which are to go hand in hand with it, seems to me a view of the subject equally novel and untenable; on the contrary, would it not be more reasonable to suppose that the educated would appreciate *more fully* the responsibility resting upon them, and the necessity for thorough operation, than the comparatively ignorant? Arguing by analogy, is it not so? Who are the surgeons that suggest and perform the most admirable operations? Surely not those whose ideas of surgery lean toward the flesh-carving view of the question. Who are the most eminent and successful obstetricians? Surely not those who, like the "practical" tooth-puller, regard as the most important acquirement of their specialty, admirable manipulation of the forceps. And lastly, who are those in our own ranks that deservedly take position as skillful, careful, and finished operators? In reply, I would say, name me those gentlemen who are prominent in the cause of dental education; who are laboring earnestly by day and by night for the advancement of themselves and others; who are striving diligently to give evidence of the practical utility of the *scientific* practice of the art; who have by no "sickly struggle," but by the most hearty and combined effort, induced not only the recipients of its means of amelioration from suffering to give daily testimony of their appreciation of the great change which has been wrought, but given the learned among general practitioners cause for astonishment, and, I would hope, gratification, at the fairly leaping progress which it has made "during the last twenty years." Name me those gentlemen, I say, and with but very, very few exceptions, I will name you those whose works speak for them, and who, in point of elegance and finished durability of manipulation, are as much in advance of the rough but solid work of those whom we delight to honor as the ornaments of by-gone days as they are their superiors in scientific acquirements. That there are those who are eminently intelligent and capable of attaining but mediocrity in operating, I admit, of course; and that there are those whose operations must rank as "first class" who cannot speak their own language correctly, is also true; but I must say, that so far as my own observation has extended, I fully agree with the principle laid down by that astute observer of human nature, "the autocrat," that all else being equal, the chances are in favor of the intelligent, educated, scientific dentist.

PHILADELPHIA, *June*, 1860.

EFFECTS OF DISEASE ON THE TEETH.

BY ABR. ROBERTSON, D.D.S., M.D.

[CONCLUDED.]

The general rule, then, is that medicines do not injure the teeth—the rare exceptions proving the rule that they may sometimes do so; and the just inference is, that where this may be the case, care should be used so to administer such medicines as most effectually to prevent it.

The question now recurs, why do teeth decay more frequently and more rapidly during sickness than at other times?

For the better elucidation of this question, it becomes necessary to inquire, what is sickness? I here use this word as a general term for all kinds of diseases. What are its causes? How do these causes act to produce it, and what are some of its effects?

For our present purpose it may be enough to say, that disease or sickness is any disturbance or interruption of all or any of the functions of the living body.

The principal recognized causes of these interruptions and changes of the functions which constitute disease, are indigestible and all the various unwholesome and improper articles of food; malaria, appreciable or unappreciable; sudden changes of temperature; great changes of the state of the atmosphere, electrical and hygrometrical; various emotions of the mind, as grief, fear, anger, and the like; and various viruses and other poisons.

They act upon the system chiefly, if not entirely, in two ways: either by directly mixing with and altering the composition of the blood, as where virus is directly introduced into that fluid; or by some shock or irritation of the nervous system.

The most uniformly observable manner, if not an invariable mode in which all these agencies affect the functions of the living body, is by altering the various secretions. The sweat, the urine, the bile, the gastric and pancreatic fluids, the saliva and the milk, some or all of them have been found more or less altered in most diseases; and the blood, from which all the secretions are derived, is supposed by many always to be changed in disease. It is at least evident that shocks to the nervous system, from purely mental causes, sometimes most wonderfully affect the secretions. Repeated instances have been recorded where a fit of anger has produced such a change in the milk of mothers as to cause the death of their infants in a very short time after partaking of it. I have seen a most obstinate and intractable diarrhœa produced by sudden and excessive grief, causing primarily great acidity of the stomach, and this acid acting most markedly and unmistakably as an irritant on the bowels. But as it is the saliva only—including, of course, the secretions of the salivary glands and buccal mucous membranes—that comes in contact with the teeth, or at most, that remains in contact with them, we shall confine our present inquiries to the changes that have been observed in that secretion; and after remarking that for many years I have observed that confirmed dyspeptics almost uniformly have bad teeth, and that their teeth are decayed in so peculiar a manner that I can almost unvaryingly diagnose dyspepsia by an examination of the teeth—(to this I will refer again before closing)—I shall, therefore, quote somewhat freely what has been recorded by others of the changes produced in that secretion by various diseases.

Müller's Elements of Physiology, page 362, says: "The testimony of many physiologists is, that the saliva is alkaline, but that it may vary from alkaline to acid under many and trifling circumstances."

Lehmann's Chemical Physiology says: "The secretion of the oral mucous membrane has an alkaline reaction. Human mixed saliva" (secretion of the salivary glands and buccal mucous membrane) "in an abnormal state has an acid reaction, and commonly in a fasting state. It is most commonly found acid in irritations of the primæ viæ."

Carpenter's Physiology, fifth American edition, page 412, says: "The reaction of the saliva is usually alkaline, that of the principal gland being always so in health; while that of the buccal mucous membrane is acid; so that when the former predominates, as is always the case when food is being masticated and digested, the saliva of the mouth is alkaline, while when the latter is more abundant, as is often the case during the interval of digestion, at the slow rate at which the salivary glandulæ then pour forth their product, the buccal saliva is frequently acid."

Simon's Chemistry of Man says, page 295, of human saliva: "When perfectly normal its reaction is alkaline;" also, page 301, *ibid.*: "morbid saliva sometimes contains free acids; this is most commonly lactic acid, but in some cases acetic acid is likewise present. I have frequently found acid in acute rheumatism and in cases of salivation. According to Donné the saliva has an acid reaction in all cases of irritation and inflammation of the stomach, in pleuritis, encephalitis, intermittent fever, acute rheumatism, uterine affections, and amenorrhœa. Brugatelli detected oxalic acid in the saliva of a phthisical patient."

Draper's Physiology says, page 44, that "the saliva is alkaline; but in morbid conditions an acid reaction is by no means infrequent; it has commonly been observed in intestinal inflammation, acute rheumatism, intermittent fevers."

Thus the testimony of physiologists is unanimous and conclusive that the saliva, under various circumstances, and in many if not most diseases, is changed from its normal alkaline to an acid reaction. Some of them state, as we have seen, that the saliva is usually acid during fasting. This condition usually occurs, to a very great extent, in most cases of sickness of such severity as to require continued active medication.

While, then, the patient is sick enough to require medical treatment, whether from the direct effect of the disease in altering the secretions, or from the fasting consequent upon the sickness producing that effect, or both, his teeth are constantly bathed in almost the only kind of article that has, or can have, any deleterious effect upon them.

Although this acidity may be but slight in degree, it is frequently long continued and constant, and therefore produces and must produce serious effects; and to my mind, both from theory and long-continued observation, is satisfactory and conclusive cause for the excessive ravages of caries of the teeth during sickness.

But how, I may be asked, does it especially manifest its effects?

Let us take as an example a case of dyspepsia already alluded to, especially as the effects here are usually more distinctly marked than in any other kind of disease. For here the acidity of the oral secretions is generally most excessive; and, besides this, such patients are peculiarly liable to great acidity of the gastric secretions, and this they frequently regurgitate into the mouth, and often so strongly acid as to produce at the time a very sensible and disagreeable effect upon the teeth—or what is popularly called "setting the teeth on edge." In such cases, as might be expected, the teeth if perfectly formed and sound before, will be found most decayed about their necks, that is, just at the margins of the gums; for there in such cases this acid finds most ready lodgment, and is kept most constantly in contact with the tooth; and there, too, the enamel is thinnest, and, therefore, affords the least protection to the body of the tooth; and there, consequently, what enamel there is, will be found to be removed in large patches from many or even all of the teeth, and frequently softened and rendered friable to a much greater extent. If the teeth are already decayed, if even so slightly as to be unobserved by non-professional eyes, or if they have the least imperfections in their formation, as very frequently happens, a want of perfect union of the enamel at the lines of union of that substance from the different points of its deposit, though these unprotected interstices may be ever so small, even so slight as scarcely to show the finest dark-colored lines, they afford similar lodgment for this acid, and also afford a most favorable opportunity for its fullest and most ready action, and often producing, as every dentist must have seen, whether he recognized the cause or not, most disastrous consequences.

So, too, in all other diseases which change the saliva from an alkaline to an acid reaction, this effect is produced on the teeth in the same manner, and to an extent just in proportion as the saliva is rendered more or less acid, and to the length of time that such change continues.

From these facts, then, we may fairly deduce this rule: Most diseases injuriously affect the teeth; while the exception is that some may not.

What has been said thus far of the agency of diseases in causing decay of the teeth relates to adult life, or at least to their effects upon the teeth after they have erupted through the gums. But there is another time and manner in which diseases most seriously affect the teeth. This is during adolescence—while the teeth are in the state of formation within the gums, where no medicine can act directly upon or come in contact with them. Thus, any disease at this stage of life which interrupts or suspends the functions of nutrition may prevent them from receiving a sufficient supply of the appropriate materials for their full and perfect development. From this cause I have seen a whole set of teeth, otherwise well enough formed, with only the slightest traces of enamel upon them; and it is not very uncommon to see teeth where there is but very little enamel on and near their cutting edges or grinding surfaces, where higher up on the crowns of the same teeth it is of normal quantity and quality, showing that the process of nutrition or of supply had from some cause, for a time, been suspended, and afterwards restored. This effect is also made manifest by the frequent observation that some of the teeth of the same individual may be found decayed or imperfect in their construction, while the others are sound and perfect—the decayed or imperfect ones and the sound being in pairs, and of the same class, showing that the same cause that acted deleteriously on one, had the same action on the others that were in the same stage of their formative process. So true is this, that I have often been able to diagnose at what age of the individual a previous "fit of sickness" had taken place, without any previous knowledge of the facts, and by simply observing in what part of the mouth such decayed teeth were situated.

Having now shown that medicines, judiciously exhibited and properly administered, do not, and generally cannot injure the teeth, and that many if not most diseases do, and of necessity must injure them more or less, I cannot refrain from adding that the injudicious exhibition and improper administration of medicines, and more especially the drenching themselves with quack nostrums, to which our people are so strangely prone, as uniformly do and must produce ill effects on these organs. And so, too, and in the same manner, may the eating of candies, or of sugar, or of the very staff of life, bread, or the drinking of pure cold water; *i.e.* by the taking of them at such improper times, and in such improper quantities, and at such irregular intervals as to disturb the functions of the stomach and nervous system; thus injuring the health and changing the character of the secretions. Hence, a safe general rule in relation to quack nostrums is, that any time is an improper time, and any quantity is an improper quantity, And this is true at all stages of existence, from earliest youth to decrepit age. But medicines, when so administered as to secure the object for which they are given—the restoration of the secretions from an abnormal to their normal condition, the restoration of the body from disease to health—instead of injuring the teeth, protect them from injury.

EXTRACTING TEETH.

BY ABR. ROBERTSON, D.D.S., M.D.

I HAVE read the "Practical Hints," in the DENTAL COSMOS, by DR. J. D. WHITE, from their commencement; generally concurring in them, frequently with instruction, and always with pleasure, till the last, which is that in the number for the present month, (June,) on extracting teeth. That is so entirely adverse to all my notions of correct practice, that I propose, with all due deference, briefly to pay it my best respects. And, first of all, allow me to ask if, since we now have many hundreds of well educated, sensible men in our own country alone practicing dentistry, it is not rather too sweeping a declaration to make, as you do in the very first sentence of your late article, that "daily experience shows that there is very little sound judgment exercised in the operation of extracting teeth, especially in cases that apply for the operation in the alleviation of toothache"?

It seems to me that it is; and although I have no doubt that a great many teeth are extracted that ought not to be extracted, yet I am not prepared to admit nor to believe that the whole profession of dentistry are a set of blockheads, or that when any one of its members dies all the light of the profession will go out.

Your second sentence, to meet my views of correct practice, should be amended so as to read thus: "When a patient applies for the extraction of a tooth, while suffering from pain, and we can relieve the case without removing the tooth," *and there is a reasonable hope that we can by proper treatment render the tooth useful*, "as a rule" we ought to "do so;" but if there is not such a hope, we ought at once, in the most careful and expeditious manner, to extract the tooth, unless some very extraordinary circumstances contravene—for tampering with an aching tooth, when there is no prospect of restoring it to usefulness, is but trifling with the comfort and the health of the patient. And this, it seems to me, is of vastly more importance, both physically and mentally, than the "moral influence" likely to be exerted by the judicious extraction of an aching tooth.

Slight causes, we well know, often develop most grave and intractable diseases, and therefore all causes of nervous irritation should be removed from the system as speedily as possible, and especially when the patient is of an irritable or nervous temperament.

Although I cannot believe that my learned brother J. D. W. would allow himself to be a party to deceive either child or adult, by telling them it would not hurt to extract a tooth—as might possibly be inferred by an expression in his article referred to—I cannot see what *moral* advantage is to be derived from requiring a patient to endure the pangs of that "hell o' a' diseases" until "some more convenient season" for taking out the tooth, and when it can perhaps as well and as safely be done then as at any other time. Still, I very freely admit that harshness and undue precipitancy of manner on the part of the dentist, or an awkward, unskillful method of operating, may have a bad influence on the mind of the patient; and, worst of all, that deceiving a child by telling him what is not true, in relation to any operation, cannot be too strongly reprehended; and the moral influence of thus destroying his confidence in the truthfulness of his parents and friends is more to be deplored than the endurance of much pain and many sicknesses. I therefore never allow myself, knowingly, nor any one else in my presence, thus to deceive young or old; but

I always tell them that it *will* hurt, but probably less than they expect, and much less to have it out at once than it will to suffer with the toothache for an indefinite period, and then be hurt just as badly and perhaps worse in the having it out. Does not this exert a better "moral influence" than to encourage our patients with the hope that they may not be hurt, and then disappoint that hope? Such has been my observation.

Is there any *moral courage* in the practice or the teaching that "if the tooth cannot be removed with certainty, it should not be attempted, either with young or old," and because the operator may be censured if he fail? Are the reputations of dentists generally so frail, that the failure to extract a tooth will destroy them? And have we no duties to fulfill but the guarding of our reputations for being expert "tooth pullers?" If we attempt only when we *know* we shall succeed, then should we never attempt to extract any tooth. For, are we not all sadly disappointed sometimes in what we think plain cases? Shall the surgeon never attempt to save life by an operation, unless he is sure of success? Shall the physician never prescribe, unless he is sure of success in his treatment? Then woe betide frail, afflicted humanity!

Although, "for many years," I have not often failed to extract any tooth that I have attempted, I cannot say with my learned brother, that "we have not been caught for many years in making more than a second attempt to extract a tooth;" for with all the circumspection that I can use, I sometimes find myself obliged to try more times than that, and I am not aware of ever having got myself into any "scrape" by thus conscientiously trying to do my duty.

And is it "not the duty" of every man who holds himself out to the community as a dentist, "to attempt to extract a tooth for a patient under any circumstances," (unless they are very extraordinary,) "if the patient suffers pain or inconvenience from bad taste in the mouth, or a difficulty in keeping the mouth clean?" If this be not his duty, and a most important and imperative duty, then I most frankly confess that I know not yet what his duty be! Is it not one of our most important duties to relieve our patients from pain, and the inconvenience of bad taste in the mouth? from causes which produce so much suffering, and which so directly disturb the functions of the stomach, and contaminate and poison the very air they breathe, and thus often produce such depressions and nervous irritations as seriously to endanger their health and lives, besides rendering them offensive to all with whom they speak?

No, no! Refusing to operate, and at once, under such circumstances, cannot be our duty to our patients, however it may suit our own feelings or convenience. At least, I have not so learned mine, and I hope that my brethren have not so learned theirs.

If my brother J. D. W. is correct in his statement, that "it would be endless to enumerate the cases that we know and hear of, where the dentist has tortured his patients for hours, and been at last obliged to abandon the operation," I fear that the dentists in his neighborhood are a great set of bunglers, notwithstanding the advantages they have had of having the DENTAL COSMOS, and a college of dentistry in their midst, and in which, if I recollect aright, J. D. W. was at one time a professor.

It is, indeed, most earnestly asked, as you so very naturally say, "It may be inquired what does it mean to get a tooth in a condition for extraction?" And it is asked, too, what he means in his answer to that question, by saying, "If a tooth is decayed much below the border of the alveolus, except the merest shell, and the gum and socket are too hard and too strong to be cut away, it is better to break down the projecting shell, or crown, and wait for the roots to loosen and rise from their sockets, as they will do in time by the morbid condition of the periosteum, and the gums, and the alveolar border?" I have never yet seen a gum so "*hard and strong*" that it could not be cut away!

But more seriously. If my brother J. D. W. were applied to, to remove a splinter of wood, or other hard substance, which had accidentally been stuck into the hand, or into the gum of his patient, would he break down the projecting points and leave it there "to loosen and rise" from its socket, as it too would do in time? If not, why then leave the root of a tooth after it is denuded of its periosteum for a considerable portion of its length, and thereby rendered as rough and irritating almost as the wood would be, to work out in that manner? Or, if applied to before it was in that condition, why should we wait to have it become so?

Although "it often happens that teeth are decayed to the pulp before they are fully erupted, and it is difficult to get at the neck with the forceps," I do not see that that is any good reason for refusing to take them out when necessary; and I think further, that the man who would at the present day, in many cases, attempt to use forceps for the extraction of such teeth, or who uses forceps generally in the extraction of the roots of teeth, and especially if they are so decayed as to be mere brittle shells, or who cannot safely remove a tooth, and more particularly a lower wisdom tooth, before it has fully erupted, is not entitled to the reputation of being a "tooth puller."

WHEELING, Va., *June*, 1860.

We give place with pleasure to the above strictures on our article on extracting teeth, under the head of "Practical Hints," by our esteemed friend and contributor, Dr. Robertson. We are beginning to believe that practical hints are as good a way to arouse discussion on the various subjects in our profession as regularly set articles; but we do not desire to occupy as ultra ground as some reviewers dispose to push us to. We may be pardoned for suggesting that a little more care in making quotations, and reflection before deductions are drawn, would be better for both sides.

We did not intend to make our assertion quite so broad as the doctor gives us credit for; instead of the quotation reading "daily experience," it reads "almost daily," etc. The doctor admits that a great many teeth are extracted that ought not to be, and says, "yet I am not prepared to admit nor believe that the whole profession of dentistry are a set of blockheads, or that when any one of its members dies, all the light of the profession will go out." Now this is unkind, and contrary to the spirit of any article we have ever written, and not in keeping with the tone of the author's former articles. If the article, "Practical Hints," referred to is "so entirely adverse to all my notions of correct practice," we must assert that we have the facts for the position we have taken, or we would not have taken it, and we have long contemplated calling the attention of the profession to it. We cannot see the wide difference in our second sentence that the doctor attempts to make; the sentence in our article "there are very many circumstances to be taken into consideration, however," is leaving the "reasonable hope" to the judgment of the operator; and we think more respectful to the good judgment of the profession than to attempt to define every detail in the great variety of circumstances and cases. We never "tamper with an aching tooth," or "the health of the patient;" we are not willing to be placed second to any one in the profession in a proper sensibility on that subject, as far as our abilities will enable us to judge and act. We never allow a patient to suffer "the pangs of that 'hell o' a' diseases' until some convenient season." Now is it fair to charge us with this in the face of this sentence? "Palliate the pain, or at least make an effort to do so; as a general thing, this can be done, if it be from exposed pulp or incipient abscess." We never make it a point to tell patients that it *will* hurt to extract a tooth, or that it *will not*. We occupy a middle ground, and endeavor to get the advantage of their *moral courage*, and then we always produce a proper *moral influence*. The doctor further says: "Is there any *moral courage* in the practice or the teaching that, 'if the tooth cannot be removed with certainty, it should not be attempted, either with the young or old?'" If we cannot rely on our patients for *nerve*, or in other respects they are not in condition, we do not attempt to extract a tooth, unless there is "impending danger;" this we leave to the judgment of the operator. And when the case becomes parallel with the duty of the "surgeon" or "physician" we always act, though the chances may be greatly against us, although we think the doctor is calling on his imagination in drawing a parallel between the two. We do not deny that it is the duty of a dentist to extract a tooth when called upon to do so, if circumstances require it; but not for bad taste in the mouth, or from difficulty in keeping it clean, unless the operation can be done without undue suffering. If we believe a tooth, or a number of teeth, disturb the "functions of the stomach," or "nervous system," we always consider those sufficient reasons to take some responsibility in attempting to extract teeth, even though it may cause pain and suffering temporarily, we will agree on that subject, but we do not believe in the breath doing so much harm to the stomach as some others do. The doctor, in saying, "refusing to operate and at once," etc., becomes, to our ideas, rather hysterical on this part of his subject. We do not say that a *gum* is too *hard* and *strong* to be *cut away;* we have said, "and the *gum and socket* are too hard and too strong to be cut away." We cannot agree with our esteemed friend, that he makes a strong case by comparing the treatment of a splinter in the flesh as analogous to the root of a tooth. We really think, that if the doctor will re-read and study our article, he will not find us far wrong.

J. D. W.

PLASTIC MATERIAL FOR CEMENTS, LUTES, TEMPORARY FILLINGS, ETC.

BY DR. B. WOOD.

Gutta-percha.—Few substances have in so short a time acquired more importance in our profession than this. In nearly all the uses to which it has been put, it has proved itself of *some* benefit—a fact which can be affirmed of few other substances, though of much greater pretensions. Vulcanized, it assumes, in conjunction with the "hard rubber," high claims as a substitute even for gold in mounting artificial teeth. But not to speak of this, or of the varied uses to which it is so generally applied, I will mention here two or three simple preparations of it which I have found useful either at the chair or in the laboratory.

As a temporary filling, gutta-percha is perhaps as *durable* as any other plastic material in use, except amalgam. It has the advantage of being perfectly innoxious beyond suspicion. It is, however, quite troublesome to apply; clinging to the instruments rather than to the tooth, whether in introducing it in the first place, or smoothing it afterwards, so as to draw out of the cavity; or if left to harden, it is too firm and tough to admit of trimming off with a sharp instrument without danger of displacing it. These difficulties are of course increased if there is the slightest moisture present. Mixed with silex, lime, or other earths, as in the preparation known as "Hill's Stopping," it is more easily applied and trimmed off, owing to the diminished cohesion of its parts; but it is, for this reason, more easily worn away by attrition in mastication than in its pure form; this *hardening*, which simply renders it *harder to melt*, is objectionable for sensitive teeth and those with exposed nerves, on account of the greater heat required in making the application.

I am not aware of any substantial improvement of gutta-percha in the quality of durability consistent with other qualities essential for this use;

but the following preparation obviates the objection just referred to, and will answer the ordinary requirements of *temporary* fillings:—

Two or three parts (by weight) best prepared gutta-percha, one part gum sandarach, one part gum elemi; melt in porcelain cup, taking care to avoid burning, and stir the ingredients while melting so as to secure a perfect mixture.

Gum elemi readily combines with gutta-percha—and, indeed, when liquefied by heat, is a perfect solvent of it—and it promotes the combination of sandarach, which otherwise mixes imperfectly and with difficulty.

This compound is somewhat harder (though less *durable*) than gutta-percha, softens more readily by heat, and is more convenient of application. It admits of packing, gives little trouble by clinging to the instrument, while the superfluous portions may, by the point of a plugger held a moment in the flame of a spirit-lamp, be removed as easily as wax. It will adhere to the cavity although moisture be present; and, when desired, the whole may be cut out again with facility. For this and other reasons, I use it altogether in sealing up cavities after having made an application to destroy the nerve. In such cases we cannot always dry the cavity; frequently the nerve bleeds, or if we make the application with a pellet of cotton moistened with creosote, (which I regard more efficacious than arsenical *paste* or *pill*,) we have a wet surface, rendering the application even of wax troublesome. Wax is too soft for a secure cerement, while to remove gutta-percha from deep cavities, in which alone it can be well secured under the circumstances, is something of a task—which objections led me, some two or three years ago, to "invent" the above substitute. By using the white prepared gutta-percha, or a mixture of it and the pale pink, we can secure a *color* as desired.

Another compound, prepared at the same time, which will be found a very useful *adhesive* cement, consists of from two to three parts of gutta-percha (white or colored, as desired) melted with one part of gum elemi. It is the most adhesive cement I know of. It will stick to *anything*, no matter how smooth and glossy the surface, and does not appear to object much to moisture. It is tough and strong, and not being affected by water or acids, is convenient in a variety of ways about the laboratory—for repairing plaster casts, wood, glass, crockery, etc.

A useful cement for sustaining teeth on a plate while taking the *fit* in the mouth, and preparatory to covering with plaster, is made by melting together equal parts of gutta-percha, beeswax, and rosin. It adheres better than wax, is harder and stronger, but not too adhesive to prevent its ready removal when desired. I generally use it made up into cylinders or sticks, melting one end over the flame of a spirit-lamp and letting it drop on the points to be united.

Water-glass, or Liquid Silicate of Potash and Soda.—Soluble glass, produced, as is well known, by the combination of silex with potash, or soda, or both, and rendered fluid by solution in water, has for some time past, in consequence of the improved modes of preparing it, led to high expectations in regard to its application in the arts. I have not been able to turn it to much account in dentistry. It signally fails for some of the purposes for which it has been highly recommended. As a varnish, it cracks and is injured both by heat and moisture. Combined with a mixture of lime and sand, or with other earths, it forms, on drying, hard cements, differing, however, in relative hardness according to the earthy materials. But these for the most part soften and disintegrate in water, which dissolves out the silicate by which the other ingredients are cemented together. This may in most cases be obviated by saturation, after drying, with dilute acid, which, combining with the superabundant alkali, transforms the *soluble* into *insoluble* silicate, the latter serving as the medium of cohesion. Also the compounds made with the silicious earths are not affected by water, if subjected to a red heat. In this case also a portion of the alkali appears to be disengaged, probably to enter into combination with the earthy matter, leaving the glass in an insoluble state. But in practice these resorts are inconvenient, and generally inadmissible. But another difficulty with the most of these mixtures is, that the upper or exterior surface dries and contracts before the lower is hardened, causing the mass to crack and warp; and, what is a more serious objection, these lower or interior portions, which are so much slower to dry, are generally found wanting in coherence, so that they readily crumble away; the solid constituents of the solution having apparently been abstracted and appropriated by the exterior portions during their solidification. Clay and the finer earths are peculiarly liable to this fault, while the coarser and more granular earths are comparatively free from it; their porosity allowing them to dry more uniformly throughout.

A cement, free from the objections last mentioned, and one of the hardest of the kind, is produced by mixing about equal measures of fine sand, ground spar, and marble dust, (carbonate of lime,) and making it up (as required for use) into a thick paste with soluble glass in solution, or "water-glass," of the consistency of syrup. It dries uniformly without perceptibly shrinking or warping, is free from cracks, presents a homogeneous structure throughout, and is very strong. This compound is useful as a dry cement or lute where not subjected to a high heat. But if heated to redness, it subsequently, upon exposure to the atmosphere, gradually loses its coherence, swells up, and finally falls to powder. This is due to the marble dust, or rather lime, to which it has been reduced by heat, reabsorbing carbonic acid from the atmosphere, with which it combines, leaving the other constituents "free."

For this reason the lime-earths are not suitable as admixtures in these cements if designed as a fire lute. For this purpose we may use two parts by measure of sand and one of spar; or equal parts of sand, spar, and soapstone; or equal parts of soapstone and sand. These will stand a white heat without shrinking, the last named actually expands, though it does not appear to retain its strength so well. They are useful for repairing breaks and fissures in muffles, furnaces, crucibles, etc. If spar be in excess the mass vitrifies and shrinks, but for lower temperatures it answers a fine purpose. I speak of the ground spar as obtained at our dental depots.

Soluble glass is precipitated from its solution without decomposition by alcohol, which abstracts and combines with the water. This may be redissolved by water as before.

It is decomposed by acids, which combine with its alkaline constituents, wholly or in part, and precipitate insoluble silicate, or silex, according to circumstances. So also it is decomposed by plaster of Paris, owing to the sulphuric acid in this substance. Hence, when mixed with plaster, the mass instantly hardens and lumps up, or *curdles*, and when dry readily crumbles.

With oxide of zinc it does not mix well, owing to the acid reaction of the oxide: the mass has little plasticity, is rough and granular, and deficient in strength—its "behavior" being something similar to that of a mixture of water-glass and plaster of Paris. In a few minutes it acquires throughout the consistency of plaster freshly set with water, and, like it, becomes harder by thorough drying. It is not broken down or sensibly affected by the action of water, cold or hot—indicating a chemical combination and not a mere mechanical mixture, as in the case of most earths, the soluble silicate having parted with alkali and become insoluble. I do not find it to possess qualities fitted for a useful application, and only mention it here as having been spoken of for filling teeth; but if there were no other objections, it hardens too slowly, and at the hardest is quite too frail for the purpose.

Oxy-Chloride of Zinc.—This compound is interesting in view of its usefulness in the arts—in making paints, lutes, cements, etc. It especially claims notice here owing to its recent introduction as a material for plugging teeth. Its applicability to this depends upon its constituents—oxide of zinc calcined, and chloride of zinc in solution—forming, when mixed, a *plastic* paste which passes in a few moments to a *solid* compound, insoluble in water. These substances are probably the essential components of all the variously named plastic preparations for filling teeth, which come in the shape of a powder and a liquid to be mixed into a paste for use. The specimens which I have seen exhibit the same chemical reactions and general properties as the oxy-chloride. Like it, they are insoluble in water, but soluble in acids—the insoluble sediment left being simply earthy admixtures which, for whatever purposes used, are noways indispensable to the chief result. The powders and liquid are generally scented with winter-green, cloves, or other pleasant flavor.

Mr. Sanders, a chemist of St. Louis, communicated to the profession, some time ago, the following formula for these preparations: "No. 1. The powder consists of freshly calcined oxide of zinc, 9 parts; finely pulverized borax, 1 part; finely powdered silex, 2 parts;—all mixed together. No. 2. The liquid is merely a concentrated solution of chloride of zinc in the smallest possible quantity of silicate of soda, or soluble glass."

I do not perceive that the sand, borax, and soluble glass are particularly advantageous. With chloride of zinc soluble glass is incompatible, being precipitated by it as an insoluble silicate. It is not indispensable that the chloride solution be highly concentrated, the result being dependent chiefly on the purity and proper calcination of the oxide. This, as obtained at the shops, (commonly called "flowers of zinc,") should be calcined at about a red heat. If the heat be too low, it will not set at all, or very slowly. If too high, it sets too quickly; but in this case the setting may be retarded by adding a little water, or by using a more dilute solution of the chloride.

The oxide of zinc of commerce is frequently impure, or vitiated as to this use by the mode of preparation, for which reason it is best to prepare it from the metal; burning this in a crucible and receiving the oxide, as it sublimes, in another crucible inverted over the first. The crude oxide, or the *sub-oxide*, as it may be called, and which can be prepared by keeping the metal or dross at a red heat, but below that at which it burns and sublimes, and stirring it until reduced to a powder, sets equally well, and indeed forms a harder compound. This, however, is of a dark or bluish-gray color, and may contain unoxidized metallic particles. Its *cost* is about *ten cents a pound*, instead of "*ten dollars an ounce*," the price at first affixed to the *professional* article.

Some of the plastic preparations offered for sale contain a large admixture of earthy matter, probably to diminish the expense, or to retard or regulate the "setting." Thus, while one specimen dissolved completely in acids with but a trace of sediment, another left full half its bulk in earthy powder. What these admixtures are is best known to the manufacturers. Nor is it of much moment. They are not essential to the main result, though they may promote *plasticity*—or, if nothing else, serve to disguise the composition.

The calcined oxide of zinc may be rendered more plastic as well as slower in setting by mixing with it uncalcined carbonate of zinc, (say one-fifth to one-third part,) the result being equally as hard and strong. The carbonate itself mixed with a solution of chloride of zinc does not "set," but forms when dry a clay-like mass which does not disintegrate or perceptibly soften in water; (mixed with only water and dried, it falls to powder the moment it is immersed.) Hence it would not be objectionable in the compound designed as a water-proof cement, or paint, etc., for which purpose it might indeed be used in much larger proportion than above indicated. It does not, however, appear to be an ingredient in the specimens of plastic material for dental use which I have seen.

As to the merits of preparations of oxy-chloride of zinc as material for plugging teeth, whether pure, or as prepared for dental "commerce" under the various names of artificial *plastic bone, crystal cement, diamond dentine*, or their Greek and Latin synonyms, it may be thought presumptuous for me to venture an opinion, as not having duly tested them *in the mouth*—my experiments having been made in the laboratory, in order to determine whether it would be safe to experiment with them in the mouth. They all appear to be somewhat harder than plaster of Paris. They have the advantage of not being soluble in *water*, or sensibly affected by it. But they are not hard and compact enough to resist the attrition of mastication for any length of time. They are rapidly broken down and dissolved by acids, however much diluted, such as the nitric, muriatic, sulphuric, etc., and are accordingly liable to be acted upon by the fluids of the mouth. They are further objectionable as consisting of base metallic *oxide* and *caustic*, both deleterious and ready for mischief the moment released from a state of aggregation, whether broken down by wear or by the solvents of the mouth. They also possess a chemical reaction upon the tooth bone itself, especially in the moist state in which they are introduced, which cannot fail, I think, to injure the structure at the points of contact, if not in the end destroy its vitality throughout. The precautions necessary to counteract the *setting of the teeth on edge*, and to prevent excoriation of the gums and lips wherever the paste happens to touch, should, it seems to me, be sufficient to warrant some opinion, without the necessity of first subjecting the material to the "*test of time*" in the mouths of our patients.

We ought, at least, to know what an article *is*—its composition and nature—before undertaking to tamper with it in our practice.

NASHVILLE, TENN., *May* 20, 1860.

FILLING TEETH WITH OSTEOPLASTIC.

BY JESSE W. CORNELIUS.

As there appears to be quite a diversity of opinion relative to Pearson's Osteoplastic, I have determined to present my experience with regard to it.

I have employed it some time in my practice, filling teeth in several cases which it was impossible (owing to the shape of the cavities) to fill with gold, and so far find it a decided success.

Two months ago I visited a patient, Mr. C., who had a central incisor that was half decayed by caries. The tooth had been filled several times with gold, but the plugs would not remain in. After some time spent describing the nature of the osteoplastic, he finally consented that the article should be employed, remarking, however, at the same time, that he had but little faith in the ultimate success of the effort. A few days ago I called upon him, and found the filling looking as well as the day it was put in, and that no unpleasant sensations had been experienced since my last visit.

I have filled many other teeth radically affected with caries, and in all the cases entire satisfaction has been given. Several of my own teeth were filled, about six months back, with this preparation, and, so far as I can determine, they are in a perfect condition.

Bearing, as the osteoplastic does, a close resemblance to dentine, and on that account being a desirable filling for the front teeth, after being thoroughly tested, I think it will supply the place of gold in many instances.

CEDARVILLE, Ill.

"OS ARTIFICIAL FILLINGS."

BY D. VAN DENBURGH.

"It becomes us in the treatment of the natural organs, to try new materials with caution."—C. H. ROBERTS, M.D. (*Dental Cosmos*, June, 1860.)

IN most of our dental journals appear advertisements and laudatory articles of a new cement for filling teeth, of which zinc, in its forms of oxide and chloride, is the principal and essential ingredient, but known among dentists by various names, which are "Os Artificial," "Osteoplastic," "Adamantine Enamel," and doubtless a score of others equally *os*-tentatious. From the newspaper advertisements of dentists, and from the better evidence of frequently seeing teeth filled with this material, it would appear that many dentists throughout the country are using it.

So far as I have had opportunities to observe the action of this substance in the mouth, the results are precisely such as might be expected from the known chemical constituents of it. After a few months wear it generally appears soft and crumbling, broken away from the edges of the cavity, and the tooth itself in many instances softened and corroded as if by the action of an acid. By these observations I was led some weeks since to procure a package of C. H. Roberts's Os Artificial, and to subject it to some experiments in my laboratory calculated to test its qualities as a tooth filling.

This paste, when properly mixed, begins to harden almost immediately, and requires, when free from moisture, two or three days to attain its utmost firmness and strength. In this state it has a grayish-white color, and in other respects resembles slate-stone.

The following are the results of my experiments, so far as they bear upon its use in dentistry:—

1. The presence of moisture interferes with its hardening, and in a great measure prevents it. It requires half an hour to attain a power of resistance equal to that of "Hill's Stopping," so that if kept dry it takes as much time as gold filling, and if not kept dry, its edges and surface will never attain this power of resistance.

2. It will not adhere to a tooth when dry and hard. Placed upon a smooth plain surface of a tooth, it drops off with a mere touch when dry.

3. It is not impervious to water, but will absorb it like stone. A dry piece of certain weight will exceed that weight after being soaked in water, though the surface be wiped dry.

4. It shrinks in hardening. Fill the end of a glass tube one-quarter of an inch in diameter with it, and twelve hours afterwards water will escape from the tube around the plug, and the plug will easily slip out. A cavity in a tooth filled with it will absorb a colored liquid around the filling.

5. Acids work upon it with avidity. Diluted sulphuric acid, without any apparent effect upon the tooth, will in a few hours entirely disintegrate a filling of this material. Common cider vinegar and lemon-juice have the same effect.

These are simple facts that any one may prove almost as easily as doubt, and, so far as the value of this paste as a tooth filling is concerned, any one of them is sufficient to prove it worthless.

OSWEGO, N. Y., *June*, 1860.

A NEW ALLOY.

BY M. H. CAMPBELL.

HAVING lately been trying a course of experiments with alloys by way of finding some combination of metals which would more entirely resist the action of bad mouths and worse stomachs, I have found the following a plan, which works well in some difficult cases, which I will report, as I doubt not many, if not all who practice dentistry, have met with similar ones. A short time since, I had a plate presented to be replaced by me by one which, as the patient expressed it, "would not rot in her mouth." The plate had the appearance of very old silver, and which had never been cleaned; but upon boiling it well in acid and afterwards in a strong alkali, it proved to be an eighteen-carat gold plate with solder a little less than twelve carats. After cleaning thoroughly and replacing it in the mouth, it commenced to oxidize upon the surface of the solder, and in thirty-six hours it would be of a greenish-black color upon the solder and backings of the teeth, and a dark purple over the rest of the plate. After puzzling over it for awhile, I hit upon this plan: I took gold coin and melted it with sufficient platina to reduce it to twenty carats fine, which I could easily solder with twenty carat gold alloyed with silver. Made a plate after that plan, and found it bright after three months wear.

I discovered this plan to be still more useful in making silver plates, (which every country dentist must use more or less,) and the objection to which is the brass in the solder. Now, by melting the silver and refining it, and then adding to every ounce two or three dwts. of pure platina, you can use fine silver for solder, thus doing away with the use of brass and copper entirely. Perhaps I am only telling what some one else has told before me; but the idea is original with me, and having never seen it noticed, I know not whether I am telling anything new, or only boring you with an every-day saw. But I trust that if the latter, you will see in my youthfulness a sufficient excuse for not knowing it before. If this is not too aged, and you consider it worthy of mentioning in your valuable journal, you are at liberty to make any use of it which you deem proper, and I shall feel repaid for my trouble if it should by any means prove of service to any one.

FULTON, N. Y.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of June 12th, at eight o'clock.

President, Dr. Dillingham, in the Chair. Present, Drs. Buckingham, McQuillen, Garretson, Fitch, Flagg, Barstow, Van Osten, Harris, Peirce, Roberts, Townsend, Hopkins, and Barker.

The President announced the subject for discussion to be the

"TREATMENT OF THE DENTAL PULP."

Dr. Peirce remarked, that before considering the subject of discussion for the evening, he desired to present to the notice of the Association an interesting case. About four years since he treated for Dr. Barstow an exposed pulp, in first right inferior molar, removed the pulp and filled the fangs as perfectly as was in his power. The tooth subsequently became painful from periosteal inflammation, and was extracted; the pain, however, has not been alleviated by the extraction of the tooth, but still continues, appearing to be located in that portion of the jaw from which the tooth was removed. The pain is local, and of a paroxysmal character, being often induced by movement of the maxilla, but does not extend above the angle of the jaw. He would be glad to hear any suggestions for its alleviation.

Dr. Buckingham remarked that he had frequently seen similar cases, and, indeed, occasionally suffered himself from neuralgic pain located in the right superior maxilla, from which all the teeth had been removed. He has found nothing that would permanently relieve the pain.

Dr. McQuillen, after an examination of the mouth, suggested the removal of a filling, in the anterior approximal surface of the second inferior molar, (adjoining the tooth that had been extracted,) as it appeared to be defective, and there was a possibility that the pulp might be nearly, or quite, exposed under it. If this was not the case, the cause of trouble was no doubt somewhere along the course of the third branch of the fifth pair of nerves, as it runs through the bony canal of the lower jaw. Under such circumstances, should the pain become unendurable, relief could only be obtained by trephining the lower jaw and removing a section of the inferior maxillary nerve, an operation introduced by Prof. Pancoast for relief of facial neuralgia, and followed by the happiest results. He sincerely hoped, however, that the pain had its origin in the tooth referred to.

Dr. Peirce was glad to hear the suggestions of the gentlemen, but did not consider the tooth referred to by Dr. McQuillen to be the cause of the difficulty, as he had examined it very carefully.

He would now consider the subject for discussion, and remarked that he had never successfully treated an exposed pulp by the methods advocated by some practitioners, such as touching the exposed part with nitric acid, capping with gold or quill, and the many other modes that had been suggested to preserve the vitality of the pulp after exposure. The failure of these methods he thought due to the irritation of the pulp, induced before the case is seen, and often before the pulp is exposed, and if the tooth is filled while in such a condition, the pulp, from contact with a foreign substance, soon loses its vitality, the tooth is changed in color, and will, eventually, be lost from periosteal inflammation, if not relieved by being thoroughly cleansed and fangs properly filled. He has therefore entirely discarded such treatment of the pulp when exposed, but if a thin septum of dentine protects the pulp, would bridge his filling, preserving the dentine from pressure, and the pulp from changes of temperature.

When the pulp is exposed, applies the arsenical paste, composed of arsenious acid, morphia and creosote. He was surprised to see, in one of the text-books upon dental surgery, a remark by the author that sulphate of morphia was useless and objectionable, and should be discarded. His judgment was directly the reverse, and considered it particularly valuable, as it arrests much of the pain which is induced by the application of the remedy, and thinks, where it is used and combined with the others in the proportion of two-thirds morphia to one-third arsenious acid, with creosote sufficient to make a paste, there is less liability to induce periostitis than with the old formula in which morphia is discarded.

The time to leave an application of the paste in a tooth must of course be influenced by the age and condition of the patient; usually, in adult teeth, allows it to remain twenty-four hours; after having removed the application, is in the habit of placing in the cavity a pledget of cotton, and allowing it to remain another day. His reason for so doing is in consequence of the greater facility with which the pulp can be removed, than where it is attempted immediately after the death of the pulp and the removal of the application.

Dr. McQuillen remarked, as patients frequently present themselves to the dental practitioner, complaining of odontalgia, in which it is somewhat difficult to determine whether the pain is due to *actual exposure* of the pulp, or the *inefficient protection* afforded to it from variations of temperature by a *thin covering of dentine;* and as it is an incontrovertible fact, that the pulps of a great many teeth have been destroyed by applications of the arsenical paste, when they were not exposed, it becomes a matter of paramount importance that an *accurate diagnosis* should be formed prior to attempting any course of treatment.

In forming his diagnosis, he is guided by the following evidences:—

First.—The statement of the patient, that the pain is *severe* and *constant*, and increased by the pressure of foreign substances, particles of food, etc., in the cavity of decay; (but not by the mere occlusion of the teeth;) and becoming more *intense* toward, and during the night, owing to the nocturnal febrile exacerbations, that all persons are more or less subject to, as evinced by the flushed cheek and sparkling eye.

Second.—The visible exposure of the pulp, or if this is not accurately defined, the oozing of blood or serum from it (and not from the gum) into the cavity of decay. When the cavity is out of sight, a small piece of tissue-paper introduced by a pair of tweezers will determine the presence or absence of the blood or serum.

Third.—The plan adopted by the late Dr. Townsend in doubtful cases, which, he believes, is as follows: If on packing a pledget of cotton into the cavity after the caries has been removed, the pain is *increased* and *continues* after the removal of the cotton, the pulp is exposed; but should it *lessen* in a few seconds, and *eventually cease*, a thin covering of dentine will be found protecting it.

Fourth.—The *experimentum crucis*, touching the pulp with an excavator or a probe removes all doubt of the actual condition of affairs. This, however, should always be avoided if possible, as it creates an intense and unnecessary pain.

If the examination should prove that the pulp is covered by a thin septum of dentine, the treatment should be prophylactic. To accomplish this, the mere introduction of a gold filling, however perfectly introduced, is not always sufficient; for the variations of temperature to which the pulp is exposed by the conducting quality of the gold, is frequently quite as efficacious in destroying the pulp as the arsenical paste. Under such circumstances, he adopts a method suggested recently to him by Drs. Dunning and Smith, of New York. Before introducing the gold filling, the sensitive dentine is covered with a *thin* layer of gutta-percha, which, acting as a non-conducting medium, protects the pulp from the pernicious influences of depressed or elevated temperatures.

Should the pulp be found exposed, he has, with due respect to the opinions of those with whom he differs, but one course of treatment, and that is, to make an application of the arsenical paste; for in all the cases where he has made careful efforts to preserve the vitality of *exposed pulps*, he has found it necessary eventually to remove the fillings, and apply the paste to a living pulp, or extirpate one already dead. And in addition to this, has seen cases from the hands of fellow-practitioners in which the same mode of treatment had been pursued with equally unfortunate results.

Before applying the paste he endeavors, by the removal of the caries, to make as thorough an exposure of the pulp as practicable, so that the application may be placed in direct contact with it. This paste, consisting of the well-known proportions of arsenic, morphia, and creosote, is introduced upon a pledget of cotton; over this is placed a large piece of cotton, which completely fills the carious cavity. The patient is then dismissed until the next day, when the application and pulp is removed. The first step in the latter operation is to make the opening into the pulp cavity as large as possible. After this, introduces delicate and malleable broaches, either barbed at their sides, or with hooked extremities, and by *twirling* them in the pulp cavity, entangles and removes the devitalized structure. There is nothing, perhaps, in the practice of dentistry more deceptive than the impressions practitioners are liable to form with regard to the entire removal of pulps, for instead of extirpating them, they are frequently forced far up the fang, and even after the removal of what was conceived to be the entire structure, a careful investigation discovers a considerable portion still in the fang. Every one no doubt can recall such cases as these. The decomposition attendant upon such remains, is, undoubtedly, one of the most fruitful causes of periodontis.

Having removed the devitalized pulp, after washing out the pulp cavity with a syringe, and then drying with tissue-paper, he endeavors, to the best of his ability, to *fill* the entire cavity *with gold-foil*, carrying the material as far into the *fang* or *fangs* as practicable.

A proper regard for truth would not permit him to claim the uniform success that some assert have attended their efforts. He had met with gentlemen who stated positively that they never had any failures. He is free to confess, however mortifying the acknowledgment might be regarded by some, that he has had failures. And when taking into consideration the idiosyncrasies, temperaments, and cachexiæ, (the inflammatory, scorbutic, syphilitic, etc.,) that patients labor under; and the fact that a tooth from which the pulp has been removed is not in the perfect physiological condition it was before that occurred, and is, therefore, *predisposed* to disease, particularly in the cachectic conditions referred to, and when subjected to an exciting cause such as inclement weather, he had reason to believe that all, and knew that many have their failures.

Dr. Flagg considered it was of the first importance to be able to diagnose positively the existence of an exposed pulp, and was impressed with the truth of this position from having seen many cases that had been subjected to arsenical treatment for days and weeks, with a view to the destruction of a *supposed* pulp, when no such organ had been in existence for months and possibly years. Has tested for exposure, in various ways, and forms a diagnosis by the combination of various results; uses hot and cold fluids, and expects an immediate and painful effect from their application; occasionally touches gently with an untempered probe, and stated that he did not regard it as absolutely necessary to inflict much pain by so doing, provided it was done very gently—considering that it afforded the most positive indication of the best location for the pulp-destroying substance. He examined cavities which opened posteriorly, with mouth-glass, and probed by reflection, depending much upon an accurate knowledge of the relative positions and shapes of the various pulp cavities and fang canals; and, lastly, referred to Professor Townsend's method of pressing cotton into the cavity of decay, and if it produced pain, *which continued* for some seconds or possibly a minute *after*, the cotton was withdrawn—received that as very strong evidence of an exposed pulp. Has treated many cases of slight exposure with creosote, nitric acid, tannin, and various other proposed topical applications, but has yet to experience the *first case* which has withstood the test of from eighteen months to three years, the ordinary length of time required for the devitalization and disintegration of a pulp with the accompanying unpleasant symptoms. Has therefore abandoned the practice entirely. After diagnosing exposure, proceeds at once to destroy the nerve; and uses for this purpose the following: ℞.—Ars. acid, Sulph. Morph., equal parts by weight; Ol. Creosat. q.s.; made into a soft paste by triturating them for at least three or four hours. These proportions had been used both by his father and himself, and had satisfactorily stood the test of twenty-five years. He preferred a soft paste to the hard pill which had been recommended by some, in consequence of its greater facility of adaptation and the absence of mechanical irritation. Applies it upon a small piece of cotton, and requires the testimony of the patient that it touches the "sore spot," securing it in position by a cotton plug saturated with Sol. Sandarach. Pain usually supervenes, which continues with more or less violence for from four to six hours, with possibly another accession about twelve or fifteen hours after the application is made, which is usually of about half an hour's duration. Allows the paste to remain for twenty-four hours, subject of course to some modification dependent upon the age and temperament of the individual. Not unfrequently finds some pain attendant upon the attempt to extirpate the pulp, but removes this by an application of pure Acid. Nit. upon a gold wire; then drills into pulp cavity, enlarging the opening with burr-drills until he has an orifice the full size of the canal; removes what portion of the pulp remains in the cavity with fine barbed or square broaches, passing them gently as far as possible into the fangs, and turning them rapidly for a long time. Allows the hæmorrhage almost entirely to cease, washes the cavity by syringing, and then carefully fills the canals, as far as possible, with a fine thread of cotton saturated with creosote; employs this as a styptic and slight stimulant to remove any tendency to congestion from undue irritation. Fills pulp cavity and cavity of decay with cotton and sandarach plug, and allows it to remain one week if possible. All is then removed, and, whenever practicable, the fang is filled solidly to the apex with gold or tin foil dipped in creosote; and experiences an *innate satisfaction* that it can only be removed with the utmost difficulty. When not practicable to fill to the end of canal, introduces a small piece of thread with creosote, and allows it to remain, filling over it and compacting with foil. Considered that the fangs of both upper and lower incisors and cuspidati; first and second bicuspids, lower; second bicuspids, upper; palatine fangs of superior molars; lateral or posterior fangs of lower molars, and buccal fang of superior first bicuspids, should always be thoroughly cleaned and filled. The palatine fang of first bicuspid superior, buccal fangs of superior molars, and mesial or anterior fangs of inferior molars, should be partially filled whenever practicable.

Dr. Fitch said, in some respects his remarks would be a repetition of those made by gentlemen who had preceded him. In reference to the preservation of exposed pulps by capping, cauterizing, etc., he must be permitted to say, that in consequence of non-success with all of these modes, he had abandoned the practice some five years since. The preservation of the pulp of a tooth is of the greatest consequence, and it should not be sacrificed whenever it is possible to save it; but, while this is true, he had little if any confidence in the means usually employed for its preservation after exposure. There are gentlemen who profess to have had success in the use of these means; yet he was disposed to doubt that it was very general. All present would readily admit that metallic fillings, or indeed any material placed in contact with the nerve tissue, would produce sufficient inflammation from pressure and changes of temperature to eventually destroy it. Operators, therefore, are not safe in cauterizing or capping, from the fact that these influences will, in the hands of most dentists, continue to operate upon the pulp, owing to some unavoidable imperfection in the plug, or the moving of the cap. It is true, success does now and then attend an operation of this kind; yet he was disposed to regard it as little more than temporary. A tooth in his own mouth proved that a pulp might die years after being filled, from very slight causes. The pulp sloughed some eight years after plugging; the tooth was healthy at the time the operation was performed, was slightly sensitive, but was not troublesome after it was filled during the eight years, up the time of the death of its pulp. At this time it became painful and extremely sensitive to the touch; upon the removal of the plug, the fangs were found filled with pus. He was inclined to question, in some instances, the formation of secondary dentine, as in this case the changes produced by the presence of the gold in the cavity, eight years after its introduction, destroyed the pulp. In diagnosing to ascertain the exposure of the pulp, usually employs the methods mentioned by Drs. McQuillen and Flagg. Having ascertained this fact, he proceeded to remove the decay of the tooth, cutting first around the point of exposure, and lastly removing the decay directly from the pulp as lightly as possible, yet having a definite portion exposed. Applies to this surface a very small piece of cotton, previously touched to the arsenious paste, which is formed of two parts of morphia to one of arsenic by weight, rubbed in with creosote to form a paste of the consistence of cream. This is left in the tooth, protected thoroughly from the secretions of the mouth, from twelve to twenty hours. On removing the preparation, usually finds the pulp partially alive; then, if not painful, which is usually the case, removes the bulbous portion of the pulp and places into the cavity a piece of cotton saturated with creosote, leaving this in the tooth usually about two days; at the expiration of which time, finds the pulp in a condition to be removed from the fangs; and with a barbed broach thrust to the apex of the fang, or as far as possible, with a rotary motion draws forth the dead pulp usually entire. After thus depriving the tooth of its devitalized pulp, introduces more creosote to allay any existing inflammatory action, leaving it in the tooth as long as circumstances require. The fangs being thus prepared, and the tooth free from pain and soreness, proceeds to plug them with gold; and to accomplish this, generally uses broaches in the following manner: having prepared or armed ten or twelve jeweler's fine broaches adapted to the size of the root canal to be plugged, by winding them with gold, dries the fang, carrying the broach thus armed to the very apex, being careful not to run it through the foramen of the root; with tweezers holds the gold *in situ*, and draws out the broach. If the gold thus introduced is the proper size, the foramina is closed at once, then with a delicate annealed steel follower or plugger, of a size easily passed into the fang, pushes the gold just introduced to one side, carrying it into the canal as far as possible. This gives space for another broach; thus he proceeds until the fang is filled. Plugs the main cavity, and burnishes, and seldom has any trouble after fangs are thus treated and filled. Never thinks of removing a fang filling; and, indeed, it would be difficult to do so, if desired, after they are properly filled, unless it be the incisor roots. Occasionally finds certain fang canals so small that it is exceedingly difficult to pass into them the finest broach; in such cases did not apprehend any unhappy results if left unfilled.

Dr. McQuillen remarked, when we take into consideration that the merest scratch may induce an erysipelatous inflammation or a tetanus, that may eventuate in the death of the individual; and on the other hand, that in many instances two or three limbs have been severed from the body, and the patients survived the dreadful ordeal, we have presented not only striking evidences of the morbific tendencies of some, and the wonderful recuperative powers of others, but we have the most satisfactory proof that he must be, indeed, a wonderful exception to the rule, who can truly claim an invariable exemption from periostitis, alveolar abscesses, etc., as sequences to the treatment of the dental pulp. A quack might, but no physician would assert that his treatment of disease is uniformly successful. The surgeon candidly confesses, prior to commencing an amputation, the removal of a cataract, or performing any of the operations in surgery, great or small, that he can not say positively what the result will be; and as freely admits that his efforts sometimes proved unsuccessful. It would be well, therefore, for the dentist, operating as he does upon the same organisms, to take as broad a scope of observation, and imitate the candor that characterizes the medical and surgical practitioner.

Our successful efforts return, encourage, and often beget an overweening confidence in our own superiority and infallibility, and our failures, which if they were presented to our notice, might teach us a lesson, and induce a proper feeling of humility, pass into the hands of fellow-practitioners, who, if questioned with regard to such matters, perhaps would tell us a different tale from what we anticipate. He certainly could afford such information to some who had asserted in his presence that they never had failures. As an evidence that even when the greatest care is exercised by the most thorough and skillful, failures may occur, he had before him a member of the Association who had lost two or more teeth treated by one who, as a practitioner, justly ranked as high as any one living or dead that has been engaged in the practice of the profession. It is but just, however, to add that the patient labors under an apparent predisposition to erysipelatous inflammation, and that the operator never made the ridiculous assertion that he had no failures, but, on the contrary, frequently acknowledged that he was far from being immaculate.

While making such statements, he wished it to be distinctly understood that success, in nine cases out of ten, (if, indeed, the average is not a great deal higher,) is sufficient encouragement to convince him that the destruction of exposed pulps is a justifiable operation. And with regard to the subsequent treatment, desired to be regarded as advocating the most thorough and radical fang filling, and opposed to the half-way measures advocated by some, of not filling the pulp cavities at all; and by others, of introducing the filling so loosely that it may be drawn out when necessary. He said this in all kindness to those gentlemen, acknowledging at the same time the *right* they possess to entertain, advocate, and pursue the mode of practice that may appear best in their own sight.

One thing is certain, however, that at a period when such diverse modes of practice are advocated, it is a duty all owe the profession, to express their honest sentiments on this subject, so that we may get at the truth. The church every few years deems it necessary, when the world appears to be going astray, to get up a revival; every four years we have a political revival, during which, as politicians would have us believe, over and again the Constitution has been saved. And if ever there was an occasion for a revival in dentistry, now is the time; and it is sincerely to be hoped that each and all will let the profession know where they stand on this all-important point.

Dr. Harris remarked that discoloration of a tooth was but the result of the removal of the pulp, and believed in all cases, it would ensue as a natural consequence. Many operators too hastily fill the pulp cavity before the vessels at the foramina are perfectly healed; as a consequence, serum is poured out and inflammation of the peridental membrane is the result. Is therefore in the habit of keeping the tooth under treatment several days preparatory to filling. He agreed with Dr. McQuillen, that the invariable success claimed by some is questionable, and believed every gentleman has failures, and no one could claim exemption. He also knew that pulps are destroyed under the impression that they are exposed, where a careful examination would prove that a thin covering of dentine still remained. Under such circumstances every effort should be made to preserve the vitality of the pulp. He regarded the perfect filling of the pulp cavity to be as essential as the compact filling of the cavity of decay.

Dr. Barker remarked that he could fully agree with the latter portion of Dr. Harris's remarks, regarding the perfect filling of fangs as necessary in all cases whenever it is practicable, and that the law that "nature abhors a vacuum" is as applicable to fang canals as in other parts of the economy; and believed that if not closed by the dental practitioner, they would be filled with serum, which would eventually decompose and be carried by endosmotic action into the tubuli, and induce discoloration of the teeth. He could not agree with Dr. Harris, that discoloration is due to the removal of the pulp, considering that if the fang canal and cavity of decay are compactly and solidly filled, no perceptible discoloration (except by reflected light) would ensue.

Dr. Fitch doubted the position that discoloration of a tooth was due to the loss of its pulp. He had seen many teeth in which the pulp had been destroyed and fangs filled that remained for years without change in color; of course, there was a slight difference between living and partially dead dentine, but this difference is only perceptible to the dental eye. He thought discoloration was occasioned by foreign substances in the fang passing, by capillary attraction, into the tubuli; and thought that, an *assumption* which claimed that it arose from the partial or entire want of the nutritive element furnished by the sheath of vessels entering the foramen of the root, was untenable. He was well aware that the health and vitality of the tooth depended to a very considerable degree upon the normal or physiological condition of the pulp; and believed that much vital force was received from the periosteal membrane, by the endosmotic current through the cementum; hence the health of a tooth was in a sense maintained after the loss of its pulp.

In numerous instances, the fangs of teeth were so imperfectly cleansed, and so rudely filled, that they became the seat of highly offensive matter and gaseous collections, which permeated the dental tissue, coloring the tooth structure and perniciously affecting the surrounding structures, rendering the tooth not only offensive, but making its preservation a matter of great suffering. Every one present must be conscious of the truth of this statement, if they ever have had occasion to remove such a stopping—the effluvia emanating therefrom is too offensive and nauseating to institute a comparison. Has been quite successful in restoring the complexion of discolored teeth to a considerable extent, and would agree with Dr. Harris, that the health of a tooth after the loss of its pulp depends much upon anastomosis; but seriously questioned the statement of the gentleman, that discoloration of a tooth was directly due to the loss of its nerve pulp. [As this position has been assumed by him, the proof of its correctness remains with HIM.] He would answer the question propounded by the gentleman, "What object has nature in placing this sheath of blood-vessels and nerve in the fang?" That the primary function of the pulp is the formation of dentine or tooth bone, and the preservation of the tooth in a proper physiological condition, enabling it to perform in the most efficient manner its high functions.

Dr. Flagg did not consider that the discoloration of teeth was due to the removal of the pulp—wishing distinctly to be understood as referring to perceptible change of color—and did not deny that the richness of vitality was in a measure destroyed; but contended that if the operation was properly performed throughout, it would require the dental eye and reflected light to detect it. Considered it due, firstly, to imperfect applications; secondly, to imperfect preparation of cavities and canals; and, thirdly, to imperfect plugging of either cavities or canals, generally the latter. Has recently seen a case of thorough canal plugging of Dr. Plantou's, which had stood, unchanged, the test of over twenty years. Stated that the removal of pulps was of much more than daily occurrence with him, and that he had as yet no reason whatever to anticipate discoloration; on the contrary, was constantly in the habit of effecting a restoration of color to teeth, with the conviction from experience, that it would be permanent. He referred to a class of discolorations, fortunately extremely rare, in which teeth, though the manipulation had been most perfect, would gradually assume a pinkish hue, and as years passed, would become red, and finally brownish. Regards the red discoloration which sometimes results from treatment of the pulp, presenting itself in the course of a few hours and passing away almost as rapidly, as a pathological phenomenon quite different. Had as yet been unable to remove satisfactorily the *gradual* discoloration referred to.

Dr. McQuillen said, the clear vital appearance presented by a perfectly healthy tooth is due to the translucent quality of the enamel and dentine, as well as the fact that the plasma circulating in the tubuli is nearly colorless. The ephemeral reddened condition that is occasionally attendant upon treatment of the pulp can only be accounted for by inferring that the red corpuscles have been ruptured, and the *hematine* or coloring matter (after mixing with the serum) is carried into the tubuli. This view certainly is more plausible than to suppose that the red corpuscles, which are the 1·3500 of an inch in diameter, could get into the tubuli, whose diameter is 1·10,000 of an inch, or $\frac{1}{3}$ less. With regard to the permanent discoloration that teeth sometimes present, varying from a deep indigo color up to a shade hardly appreciable from adjoining vital teeth, he believed that in the majority of cases, if not in all of them, it is owing to carelessness on the part of the operator, and the *liability* is greatly increased by *leaving the fangs unfilled.* At the same time, it must be borne in remembrance, that on account of the tubuli being relatively larger, there is a greater liability to discoloration in very young than in old teeth. The discoloration, that the gentlemen refer to, is, he believes, more *apparent* than *real;* there is *actually* no change in the color of the dentine; for when the mouth-glass is placed under the tooth (the only way by which any difference can be detected,) the light reflected from it is prevented from passing through the translucent tooth substance by the opaque filling of gold which occupies the pulp cavity.

Dr. Buckingham remarked, that no one could hope to meet with complete success in all cases where the pulp was treated, as the inflammatory tendency in some constitutions was of such a character that the slightest wound would run into that state; but where the person is perfectly healthy the pulp could in most cases be removed, and the tooth give no trouble. He considered that when discoloration occurred from bad treatment of the pulp, the natural color could not be restored; and has noticed teeth that have been extracted, where one of the fangs would be very dark and the others of a natural color, with the periosteum living upon each. He should like to know what change takes place at the apex of the fang. Are the foramina closed by an ossific deposit, or occupied by the remains of the pulp? He had seen a preparation of collodion and chloroform suggested as an additional protection to the pulp when it is covered by a thin septum of dentine, and considered it might be useful in some cases.

The subject of "Saliva" was chosen for next discussion.

EDITORIAL.

DENTAL EDUCATION.

It can hardly be regarded as an over-estimate to suppose that the yearly additions to the profession throughout the entire country does not fall far short of five hundred persons; of this number, a little over one-tenth only are graduates from the dental colleges. In alluding to this numerical difference, the object of this communication is not to institute an inquiry into the comparative merits of the two systems—private preceptorship and collegiate instruction — but, believing that the welfare and safety of the community and the advancement and elevation of the profession demands that the student should enjoy the advantages of both: the aim is to direct attention to deficiencies which should be corrected.

In Europe, from early childhood persons are destined to enter upon and educated for particular pursuits; and, whether fitted or not by natural qualifications for the profession or trade selected, they are expected to, and do, live and die in it. Such, however, is not in keeping with the genius of our country. The young and restless spirit here, having, in obedience to the will of parents, the force of extraneous circumstances, or more generally in accordance with its own inclinations, entered upon some avocation or other, and, after pursuing it for a certain time, discovers a want of fitness or congeniality for the pursuit, hesitates not about the propriety of changing; but, on the contrary, enters *boldly* upon some other calling, and failing in *that*, tries another, and another, until at last it finds itself in the position for which it *believes* it was intended. No profession or trade is exempt from this influence. And in dentistry, in particular, the number of practitioners is extremely small that have not at some period in life been engaged in other avocations. There are advantages and disadvantages connected with each of these.

One great disadvantage attendant upon the last, is the fact that at the very threshold of professional life, the student is too often subjected to great inconvenience from the want of preliminary instruction. Sometimes, misconceiving the true value of his previous attainments, or mistaking the bent of his genius, he enters upon the study of a science which, like the profession of medicine, demands above all a good education, sound and discriminating judgment, talent to acquire knowledge, memory to retain, tact to apply it, skillful manipulation in the performance of operations, and that kind of moral ascendency which inspires confidence in one's self and an almost implicit faith on the part of others.

That numbers of dental students have been admitted in the offices of their preceptors who were deficient in the most common branches of an English education, and that a proper inquiry into the fitness of young men to become students is, even now, seldom instituted, are positions which can scarcely be controverted.

In former periods, and in other countries, the time and expense may have been such as to preclude many from the advantages of an early education; but in our country, with the facilities now afforded by cheap books and free schools, an individual who attains to manhood without acquiring, in addition to the elementary branches of learning, a fair acquaintance with natural philosophy, chemistry, etc., and is content to remain so, possesses neither the aspirations, energy, or industry requisite to make him a thorough practitioner or a successful cultivator of dental science, and it would therefore be a kindness to him, as well as an act of justice to the public and the profession, to advise him to devote his energies in some other direction.

Preceptors sometimes fail to perform their duty on another point. Affording their students every facility, encouragement, and direction with regard to *mechanical*, and *occasional* opportunities to witness and manipulate in operative dentistry, they provide little or no means for acquiring a knowledge of the science of the profession. Possibly a few text-books may be furnished, but no anatomical preparations, diagrams, or facilities for chemical manipulation. Even when these are afforded along with all of the most approved works, though fully competent to the task, the preceptor rarely institutes a regular series of examinations and explanations in the course of studies entered upon, but leaves the inexperienced mind of the student to regulate its own pursuits, and after a probation of a few months, or year at best, the student enters upon the practice of the profession only to find that he has yet to educate himself.

It may be said, in a general way, that it matters little how the student obtains his knowledge, provided only such knowledge is obtained; and though the disparity existing among students in their acquirements depends very much upon individual capacity, yet it is evident that much of this difference must depend upon the advantages afforded for study and improvement.

That there are many preceptors who in every respect faithfully discharge the duty they owe their students and the profession, and, so far as it is in the power of a single individual, eminently qualify them for practice, is without question; but the present advanced state of the profession makes it necessary that an attendance upon the curriculum of instruction in dental or medical colleges should be superadded even to the most thorough private preceptorship. Scattered as the profession is over a wide extent of country, with many of its practitioners far removed from dental colleges, it may, in the existing state of things, be impossible for every student to enjoy the advantage of both systems; this can be remedied, however, by the establishment of schools in sections of the country that at present are not provided with them. In place of diminishing, as many may suppose, the attendance upon schools already in existence, this would —judging by the effect upon the medical schools—only serve to vastly increase the present number of matriculants; for, as we have already seen, *nine-tenths* of those who enter the profession obtain their knowledge from private preceptors alone.

The time may not have arrived yet for such a movement, but every one must admit that the interests of a great and growing profession demands that adequate preparation should be made for such contingencies, and that in accepting the position of instructors, whether as private preceptors or public teachers, it is a matter of very great moment, that those who enter upon the discharge of such a duty should not only engage in it *con amore*, but be deeply impressed with the fact that the twofold obligation they are under to the profession and community—first, as earnest, indefatigable students, and teachers, and second, as guardians of the honor of the former and the welfare of the latter—are no ordinary responsibilities.

As has been justly remarked by an eminent writer and teacher: "Doctrines and maxims, good or bad, flow abroad from a teacher as from a fountain, and his faulty lessons may become the indirect source of incalculable mischief and suffering to hundreds who never heard his name."* When viewed in this light, how necessary is it that those who accept such positions should be willing to sacrifice pleasure, time, and means in the preparation for, and faithful discharge of the duties incumbent upon them.

Lastly, far from indulging in the Utopian idea, that the newly-graduated student, whatever advantages he may have enjoyed, can be immediately transformed into the accomplished and skillful practitioner, it must be admitted that it is a matter of vital importance that the plans of instruction, the materials for illustration, and the periods of probation in private offices, as well as in colleges, should be such as will properly prepare him for the important occupation in which he seeks to engage.

J. H. M'Q.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

NATATORIUM AND PHYSICAL INSTITUTE.—A pamphlet with the above title, advocating the establishment of a gymnasium in Philadelphia, to be conducted on scientific principles, by one perfectly familiar with the most desirable and beneficial mode of engaging in physical exercise, was received some time back, and it was our intention to have presented, before this, a few extracts from an able Address, penned by that gifted medical writer, Dr. John Bell. In the course of his remarks on the deteriorating influence attendant upon city life, and the advantages flowing from a proper attention to exercise, he says:—

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* Dr. Watson, "Practice of Medicine."

"Modern civilization, with all its wonderful applications of science and art to the increase of personal comfort and the promotion of social pleasures, tends, unfortunately, to a precocious development of both mind and body, unfavorable alike to vigor and duration. This tendency is most evident and progressive in the crowded population of cities, whose inhabitants, by the very circumstances in which they are placed, constantly sin against the natural laws established by the Creator for their well-being, and pay the penalties for their transgressions in their weakened frames and puny offspring. Deteriorating influences of this nature, continued through a few generations, would soon depopulate a city, but for the reinforcements which it is constantly receiving from the country. * * * *

"*Of the primary causes which bring on premature decline and shorten life, the most conspicuous are a defective supply and impurity of air, and want of regular bodily exercise.* Partial correctives are found by a limited number of the inhabitants of a city in their retiring to the country during the summer season, while others seek renovation in travel and visits to the sea-shore and to mineral springs. They who remain at home obtain limited relief in public squares, which are so many magazines for the supply of a pure air, and in daily walks and rides. But all these resources, notwithstanding their undoubted value, fall short of the wants, as they do of the ability, of the majority to procure them; and they fail to prevent and but imperfectly checks the incessant 'wear and tear' of town life, with its toils, its cares, and its anxieties. In doors, everywhere, by day, and still more by night, people suffer from a deficient supply of fresh and pure air, and from its vitiation by breathing, and the processes going on in the workshop and the factory, owing to defective ventilation. The deleterious operation of these causes is rendered much more efficient by the want of active exercise in the open air, and the constrained postures to which persons of all ages, from infancy to manhood, are subjected. That which is begun in the nursery is continued in the school-room, the study, the store, the shop, and the factory, and to such an extent that entire symmetry of frame and a natural and easy gait and carriage are as rare as if they were exclusive privileges, which could only be secured by the expenditure of much time, labor, and money.

"*Men round-shouldered, and women with more or less obliquity of the spine, or back-bone, make the rule instead of the exception.* * *

"Associated with, and indeed a cause of this yielding of the spinal column or back-bone, is weakness of its own muscles, and of those which connect it with the haunches below and the chest and arms above. The muscles of the limbs and body at large, which are contractile and moving parts, participate in this weakness, and hence the slowness and languor of movements, and disinclination, with diminished ability to engage in locomotion and other exercises. *A little observation shows that the exercises and postures and most of the occupations of mankind are such as to call into action the muscles of one side of the body more than the other, and this one-sidedness becomes a general cause of the greatest and most universal deformity.* The exclusive use of the right arm, which is preferably employed in nearly all the acts of life, whether these be the merely mechanical or others in which the intellect is more especially concerned, leads to deviation and deformity, chiefly toward the right shoulder. At school, the predominance of the right arm, by the exercise of its muscles, is out of all proportion, or rather bears no proportion at all to the use of those of the left arm. Thus, in writing, drawing, guitar-playing, harp-playing, and even in piano-forte playing, it is the right arm which is either exclusively or chiefly occupied. The muscles of the right arm act first on the shoulder-blade and the ribs which are connected with the spine; and these, in turn, pull the spine itself toward the right side, and thus cause the first curvature in that direction. In walking behind a person, it is very seldom that we see an equalized motion of the body; and if we look to the left foot, we shall find that the tread is not so firm upon it; that the toe is not so much turned out as in the right, and that a greater push is made with it. From the peculiar form of woman, and the elasticity of her step, resulting more from the motion of the ankle than the haunches, the defect of the left foot, when it exists, is more apparent in her gait.

"REMEDIES.—Do not these great and progressive evils call for early and continued means of prevention, and, in their first stages, of cure? How shall rectification of obliquity and restoration of strength be procured? We believe that we can place the means of relief and cure at the disposal of all classes of our fellow-citizens in the matured plans, to the outlines of which we now invite their attention. We promise no panacea, boast of no discovery of a new substance or subtile principle which shall penetrate through the entire frame, revolutionize all the functions, expel disease, and bring back the golden age. Leaving such promises to deluding empirics, we confine ourselves to the use of those material agents and contrivances which have been found to be efficient in all countries and in all ages, whenever they have been fully and regularly tried. Their use is suggested by nature and guided by physiology, and their efficacy proved by long experience. *They consist of various exercises systematically and perseveringly continued, with due adaptation to age, sex, constitution, and the particular state of the individual, together with the other hygienic aids supplied in swimming and the different kinds of private bathing.* * * * * * * * *

"*Gymnastics.*—The chief and the primary conditions for success, both in prevention and restoration, is to furnish the scholar or the invalid, as the case may be, opportunity and encouragement for performing that which every young being would do when left free to yield to its instinctive impulses, viz., motion of the limbs in all directions and equal exercise of the two sides of the body. *These would soon restore the strength and correct any slight deviation from symmetry.* * * * *

"Gymnastic training, in its full and comprehensive sense, has been appropriately called an apprenticeship to all the callings and professions, by its giving greater aptitude to the discharge of each of them. It is capable of benefiting alike the poor and the rich; to the former of whom it gives greater powers of labor and endurance, while the latter are prevented by it from sinking into indolence and languor, and their too common accompaniments of *ennui* and want of definite objects of thought and action. The physical acts on the moral nature, and the strength, agility, suppleness, and quickness of movement gained for the former, impart to the accomplished gymnast courage, intrepidity, self-reliance, and perseverance, which belong to the latter. The senses and intellect are strengthened, at the same time, by the habit of measuring with the eye the relative distances and the height and size of the objects which are met with, in running, jumping, and climbing, and in exercises compounded of these. With quickness of perception, thus gained, are associated precision, promptness, and finish, which are usefully applied to matters of more importance in the out-door relations of the gymnast. In ancient Greece and Rome, gymnasia were instituted and encouraged as military schools, to prepare the citizen to become a soldier. To a very great degree they constituted also schools for health. At the present time we shall invert the order of the objects aimed at, by giving health the precedence.

"*The active exercises of the gymnasium not only impart fullness and strength to the muscular or moving organs of the human frame, but they improve digestion, quicken the circulation of the blood, expand the chest, and, by increasing its capacity, enable the lungs to receive more air, and thus to purify the blood, which is afterwards distributed, by the agency of the heart, to every part of the body.*"

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When it is remembered that no pursuit is more arduous and confining than the profession of dentistry, and that too many of its faithful practitioners, from early in the morning until late in the afternoon, without intermission, are not only inhaling the vitiated atmosphere of close rooms, but assume and maintain, for hours at a time, attitudes alike uncomfortable and calculated to induce physical deformity, (the left arm resting on the head of the patient, in a passive but tiresome position, the body thrown in front of the patient, far beyond the centre of gravitation, and only prevented from falling by the support obtained at the pelvis by resting against the arm of the chair, and the constant strain made by the muscles of the back, permitting, in addition, the weight of the body to fall principally upon one, in place of both feet;) and, added to this, the fixed and continuous gaze upon bright objects, such as gold fillings, so trying to the eyes, are each and all, singly and combined, so many deteriorating influences sapping the physical and mental energies and shortening the days of those who do not seek the means best calculated to counteract them.

These are to be found alone in change of air and an indulgence in the kind of exercise which experience shall prove the best adapted to individual cases, for it is folly to advise the same kind of exercise for all. One may engage in active and violent exercises with advantage, which would be detrimental to the health and well-being of others; active exercise, such as leaping, rowing, fencing, horseback, etc., is proper and necessary for the vigorous and strong; but to one whose constitution is naturally weak, and who feels exhausted by the professional labors of the day, and who has not trained himself to engage regularly in physical exercise, that he may not injure himself, should enter upon such with great care. The passive and gentle exercise afforded by a carriage, at the end of the day's labor, will in many cases prove serviceable, but it should not be confined to that alone.

As Prof. Jackson truly says, "much has been said about the advantage of *exercise*, and an excellent treatise might very properly be written upon the advantages of *rest.*" When the body is fatigued by the labors of the day, there is no question, that "nature's sweet restorer," rest, should be sought; but those who wish to possess a clear head, a strong arm, and steady hand, and desire to live to a good old age in the possession of health and a vigorous intellect, must engage regularly in some kind of physical exercise.

Considerations such as these have induced us, from boyhood up, to seek in the gymnasium, and, better still, in the attractive and natural kind of exercise in the open air, attendant upon walking, rowing, swimming, and on horseback, to counteract the disadvantages of town life; and thus can add the testimony of years of experience, that such exercises, within proper bounds, is conducive alike to health of body and mind.

In conclusion, we would suggest that, in selecting an operating chair, too much attention cannot be paid by the dentist in making choice of one that shall be least open to objection, so far as the comfort of the patient and operator is concerned. It should be sufficiently large, and so arranged as to protect the person of the patient from contact with the operator; and yet it should not be so wide, that he is compelled to lean over so far that the effort is not only fatiguing, but prevents an easy play of the arm in filling. It should also be sufficiently elevated to prevent the unnecessary and tiresome stooping one is subjected to when operating upon a patient seated in a low chair.

Proper attention should also be paid to the ventilation of the operating-rooms by the introduction of registers near the ceilings, and where this is not practicable, by throwing open the windows (as suggested by a friend) for a few moments immediately after one patient has left, and before another occupies the chair.

As in the continuous and ever-recurring round of duties, (attendant upon a practice of any size,) toward the latter part of the day the operator is apt to have a slight feeling of fatigue, and possibly drowsiness, stealing over him, particularly after a hearty dinner, an application of cold water to the head will prove refreshing and stimulating, and enable him to discharge the remaining duties in a state far removed from the semi-superannuated condition of being half-awake and half-asleep, and not fit for anything in particular.

British Journal of Dental Science.

At a meeting of the Odontological Society, held May seventh, Mr. Mummery presented the following paper, which will be recognized as a continuation of a subject on which he had previously addressed the same body, and which was republished in former numbers of this magazine:—

"We will now turn our attention to the largest of all existing terrestrial animals, the elephant, a genus which forms the only living type of that extensive family of mammiferous quadrupeds which once peopled a large portion of the earth's surface—the true proboscidians.

"The dentition of this enormous animal is very remarkable. There are no canines in either maxilla, and the lower incisors are also absent, while the immense tusks (identified as incisors by their implantation in the intermaxillary bones) necessarily require alveoli of great size and depth. The upper jaw is thus rendered so high, and the nasal bones are so much shortened, that in the skeleton the nostrils are situated in the upper part of the face, although in the living animal they are prolonged into that remarkable organ the proboscis. The tusks are preceded by a deciduous pair not exceeding two inches in length, the bases of which are absorbed toward the end of the second year, and the teeth fall out.

"The permanent tusks appear a few weeks afterwards; the immense hollow base being occupied by a persistent formative pulp, supplied abundantly with blood-vessels; and as no antagonists are provided to wear them down, as in the base of the rodents, they attain an immense magnitude and weight. Instances are recorded in which a pair of tusks has weighed more than three hundred pounds, and the annual importation of ivory into Great Britain alone may be estimated at about one million pounds; which, taking the average weight of a tusk at sixty pounds, would require the slaughter of 8333 elephants. Of the two existing species of elephant, the African is provided with the most massive tusks, which are of nearly the same size in both sexes; while in the Indian species the tusks of the female do not attain equal magnitude to those of the male; and in the Ceylon variety not one elephant in a hundred is found with tusks, the few that possess them being exclusively males; nearly all, however, are provided with the stunted teeth called tushes, about ten or twelve inches in length, and one or two in diameter. The old naturalists maintain that the elephant periodically sheds his tusks. Ælian says he drops them once in ten years; and Pliny repeats the story, adding that, when dropped, the elephants hide them under ground; whence Shaw says, in his 'Zoology,' 'they are frequently found in the woods, and exported from Africa;' and Sir W. Jardine, in the 'Naturalist Library,' says, 'the tusks are shed about the twelfth or thirteenth year.' This is erroneous: after losing the first pair, or 'milktusks,' (which drop in consequence of the absorption of their roots, when the animal is extremely young,) the second pair acquire their full size, and become the 'permanent tusks,' which are never shed. Elephant tusks are not unfrequently found in which balls of iron or lead are imbedded in the solid ivory, a phenomenon which is thus explained: 'The ball probably has penetrated the thin parietes of the socket, and the wall of the wide pulp cavity forming the basal extremity of the tusk. If the projectile force be then spent, the ball gravitates to the opposite and lower side of the pulp cavity. The presence of the foreign body exciting inflammation of the pulp, an irregular course of calcification ensues, which results in the deposition around the ball of a certain thickness of osteödentine. The pulp then resuming its healthy state and functions, coats the surface of the inclosing mass of osteodentine, together with the rest of the conical cavity into which that mass projects, with layers of normal ivory, closing the breach in the thin parietes of the pulp cavity by which the ball entered; and as the growth of the tusk proceeds, the ball so inclosed is carried forward into the solidified part of the tusk. The occurrence of a spear-head in an elephant's tusk may be similarly accounted for. The long axis of the weapon corresponding to that of the cavity, and no opening for its admission being discoverable, it is evident that no human strength could have driven such a body through solid ivory.' From the highly vascular structure of the pulp, the tusks are slightly movable in the socket, and occasionally, as in the case of the hippopotamus, through irregular pressure on the alveolus, the tusks take a spiral or other distorted form. We hear people speak of being driven nearly mad with toothache; but instances are recorded in which the immensely large vascular pulp of the elephant has been the seat of violent inflammation, probably following mechanical injury, and ungovernable madness has been the result. A painfully interesting account is given in Hone's 'Every-Day Book,' of the destruction of a remarkably intelligent elephant at Exeter Change, in the year 1826. The animal was attacked by paroxysms of madness, which at length compelled its owner to obtain the aid of a file of riflemen to put it to death. The skeleton of the unfortunate animal is set up in the Hunterian Museum, and the skull bears marks of the many ineffectual attempts to penetrate the brain, owing to the peculiar construction of the skull, to which I shall shortly refer. In an adjoining glass case is seen the hollow basal extremity of the left tusk, which shows, by the irregular deposit of osteodentine in the pulp cavity, and the absorption of part of its walls, that the pulp had been the seat of violent and repeated attacks of inflammation; a condition which must have aggravated, if it did not originate, the uncontrollable state of the animal.

"The succession of the molar teeth differs greatly from that of the other mammals. We observed that the temporary molars are usually replaced by permanent teeth in the vertical direction, called false molars, corresponding to the human bicuspides. No such arrangement is found in the elephant; but in the whole of the molar teeth, including those earliest developed, the succession takes place from behind forward, after the manner of the true molars in the other animals, or the permanent molars in the human subject. The development of these teeth has been so admirably explained by Professor Owen, that I shall do well to quote his clear and comprehensive description: 'The whole series of molar teeth succeed each other from behind forward, moving not in a right line, but in the arc of a circle. The position of the growing tooth in the closed alveolus is almost at right angles with that of the molar in use; the grinding surface being at first directed backward in the upper jar, and forward in the lower jaw, and brought by the revolving course into a horizontal line in both jaws, so that they oppose each other when developed for use. The bony plate forming the sockets is more than usually distinct from the body of the maxillary, and participates in this revolving course, advancing forward with the teeth. The partition between the tooth in use and its successor is perforated near the middle, and in its progress forward the part next the grinding surface is first absorbed, the rest disappearing with the absorption of the roots of the preceding grinder. From this mode of advance, the upper molars are convex, and the lower concave, from behind forward.' The first molar, cut a fortnight after birth, is shed at two years old. Previously to this time the second molar has been for some time in use, and is in turn shed at the end of the fifth year. The third molar attains its full growth between the third and sixth, and is shed at the ninth year. Professor Owen regards these three as the representatives of the deciduous molars of the other animals. The fourth, fifth, and sixth molars respectively commence to penetrate the gum in the sixth, twentieth, and fiftieth year, and the two former are shed in the twenty-fifth and sixtieth years, while the sixth molar is supposed to remain during the continuation of the animal's existence. The perfection of a grinding apparatus is attained in the internal structure of these molar teeth, the three constituent elements, which we have already noticed in the other graminivorous mammals, being developed in a remarkably distinct manner. A molar tooth is composed of a series of transverse perpendicular plates, each of which consists of a central table of dentine, invested by a layer of enamel; and these separate plates are at length soldered together by the filling up of the spaces with the cement, which retains the several plates in due relative position, until, by the further development of their bases, they unite to form a solid mass of dentine in the more deeply implanted portion of the tooth.

"The appropriate name of cement, bestowed on this third element of the teeth by Baron Cuvier, is thus seen to be peculiarly applicable to the molars of the elephant.

"Each constituent plate, moreover, consists of a series of slender, conical columns, arranged transversely across the tooth, their bases gradually expanding until these columns or denticuli are blended together, and form a flat plate, with wrinkled sides, giving the undulating pattern to the line of enamel when the surface of the tooth is worn. These detached plates, prior to their consolidation by the cement, offer a rude resemblance to a hand, and have been described, when found in a fossil state, as the petrified hands of a monkey.

"As the surface of the teeth is worn in mastication, the process of enamel, resisting attrition by their superior hardness, form prominent ridges on the grinding surface, while the dentine, and especially the cement, are more rapidly worn away, a structure admirably adapted for bruising and communicating the woody fibre and other hard substances which constitute the elephant's food. The molar teeth progressively increase in size and the number of constituent plates, the first molar consisting of four plates and the sixth of about twenty-five.

"From the peculiar mode of dentition, the front portion of a tooth has cut the gum, and is employed in mastication before the back part is completely formed, even before some of the posterior denticles have been consolidated; and the back part of the tooth does not come into use until the anterior portion has been worn down nearly to the fang. When at length the complex molar has become useless for grinding, the roots are absorbed, and, aided by the pressure of the succeeding tooth, it is finally shed. It may, therefore, be said that the elephant cuts a series of *sets of teeth*, as the old ones are worn out, an arrangement which might be considered very convenient by many members of the human family.

"In the Indian elephant, the grinding surfaces of the dental plates represent flattened ovals placed across the tooth; but in the African species, these columns form in section a series of lozenges touching each other along the centre of the tooth.

"That wonderful organ, the proboscis, demands a passing notice. From the shortness of the animal's neck and the enormous weight of the tusks, the creature would find difficulty in cropping its food, were it not for the possession of this specially adapted organ, composed of multitudes of small muscles (estimated by Baron Cuvier at forty thousand,) so variously interlaced as to bestow on it the most complicated powers of mobility, in all the varieties of extension and contraction. It enables the animal, at will, to exert the enormous strength of a limb or to execute the most delicate feats of finger-like touch. Endowed with exquisite sensibility combined with power, this organ, at the will of the animal, will uproot a lofty tree or crop tender herbage, will raise heavy cannon or pick up a pin; and its great length supplies the place of the long, flexible neck of the ruminants, which would have been incompatible with the support of the large head and weighty tusks. All the processes of the cervical vertebræ are strongly developed, and the spinous processes of the dorsal vertebræ are lengthened and powerful. A glance at the head of an elephant will show the thickness and strength of the trunk at its attachment, and the massy, arched bones of the face and thick muscular neck are admirably adapted for supporting and working this powerful and wonderful instrument. The great development of the diploë, which we noticed in the babyroussa, attains a surprising perfection in the elephant.

"The external surface of the cranium is enormously extended, but the actual cerebral case bears a very small proportion to the skull, the space between the outer and inner table being filled by the extensive mass of vertical cells of the diploë, which are filled with air from the Eustachian tubes. By this arrangement the external surface of the cranium is extended for the insertion of the powerful muscles and ligaments required to support so heavy a mass of molar teeth, tusks, and proboscis, without adding materially to the weight of the head. * * * * *

"When we regard the comparatively limited number of existing British mammals, we can hardly conceive the idea that the gigantic northern elephant, extinct for untold ages, once forced his way through the tangled forests of our land, and was fitted, with his covering of long hair and closely felted wool, to sustain the rigors of a still more northern climate. The teeth of *Elephas primigenius* are found scattered throughout nearly the whole of Europe, from the shores of the Mediterranean to those of the Icy Sea. As they are not confined to the continent, but are found in the British islands, and even in Iceland, distant as that island is from the European shores, we may form some faint idea of the immense cycle of geologic changes which must have taken place since the period when the elephant was a member of the British Fauna. The tusks of the mammoth (as the animal is also called) are not unfrequently dredged up from the tertiary beds of a portion of the British Channel; and specimens have come under my notice which have been brought into the port of Dover by fishermen who had so obtained them. The molar teeth are found in many localities, as in the superficial beds overlying the chalk on the coast of Kent, and especially in the tertiary strata known as the 'Norfolk Crag.' The specimens on the table from the latter formation supply another illustration of the immeasurably long periods which have elapsed since this comparatively recent geological epoch. One of the teeth, imbedded in a cliff of compact strata, is as sharp in its outlines as at the animal's death, while the other specimens have been rolled into boulders by the action of the sea on that more ancient cliff, and yet the gravel-bed itself containing these remains was raised, long before the human period, far above the present level of the ocean. The tusks of the extinct European elephant are very much more curved than those of the existing species, and sometimes are found with a curvature almost equaling that of the ram's horn. The tusks are so numerous in Siberia, and are in such excellent preservation, that they form an article of extensive commerce as ivory. Perhaps few discoveries of the remains of an extinct animal have equaled in interest the fossil elephant, which was found frozen up in an icy tomb on the coast of Siberia. In the year 1799, a Tungusian fisherman observed a strange, shapeless mass projecting from an ice-cliff, near the mouth of the River Lena, in the north of Siberia, the nature of which he did not understand, and which was so high in the ice-cliff as to be beyond his reach. In consequence of the ice melting, he discovered in the following summer that it was the frozen carcass of an enormous animal, which at length became entirely disengaged, and fell down from the ice-crag upon a sand-bank. The fisherman carried away and sold the tusks, and more than thirty pounds' weight of the hair and bristles were collected. The head was still covered by the skin, the pupil of the eye was distinguishable, and the brain remained within the skull, while a long, shaggy mane hung from the neck. But the most striking feature in the account is the fact, that the fishermen in the neighborhood carried away large quantities of this elephant's flesh to feed their dogs, probably the only instance on record in which the remains of an animal (extinct long anterior to the creation of man) have been thus preserved unchanged through so vast a period of time, as to be applied to the sustenance of other animals contemporary with ourselves."

DENTAL ENTERPRISE—MAY.

"PARTIAL IMPRESSIONS IN PLASTER. PROF. AUSTIN.—Take first an impression in wax in an ordinary britannia cup, and pour into it plaster for making the model. In a half hour the model may be set into warm (100° Fahrenheit) water until the wax becomes thoroughly softened; it can then be drawn without breaking off any teeth. Upon this mould a plate of gutta-percha one-eighth or one-tenth of an inch thick, larger than the piece is intended to be, running up against the *inside* of the teeth, but not passing between the teeth in those spaces where only one or two teeth are wanting. Take a second piece of the still soft gutta-percha, make its surface adhesive by *dry* heat and fasten it from side to side across the centre of the plate while still upon the model; this answers the double purpose of a stiffener and a handle for removal of the impression. This plate should fit loosely, so as to go off and on with ease; if the contraction of gutta-percha is not sufficient, the sides must be pressed together while still soft. The fourth of a line between the plate and the teeth is sufficient for this purpose.

"If the model is saturated with water, there is no danger of the gutta-percha adhering to it. This is a much better preventive than the use of oil. After trimming the plate with scissors, while still warm and flexible it should be reapplied to the model. It should run nearly or quite to the edges of crowns of the teeth, except of those teeth on either side of a space to be supplied; in which case it should project a little beyond the teeth and extend across the *inner* side of such space, (if no more than two teeth,) for reasons presently given. Where a space of three or more teeth occurs, carry the gutta-percha over the outside of the alveolus, fitting loosely so as to leave a slight space for the plaster, and not coming too closely against the teeth on either side of the space.

"The next step is to coat the surface toward the model with a layer of adherent cotton or woolen fibre. This may be done by first brushing over a layer of stiff sandarach, mastic, or copal varnish, and then pressing against it a surplus of raw cotton or wool. The two first, being spirit varnishes, have the advantage of drying rapidly, the latter is perhaps more adhesive. Shellac varnish will not answer, beause not adhesive; nor gum-arabic, because the moist plaster would soften it again. Another convenient method is to hold the surface over a flame, and quickly press on the cotton while thus made adhesive. It must be quickly done, else the plate will become too much softened, and should be reapplied to the model to correct any change of shape. Pick off the surplus non-adherent fibres, and then, after trying the plate in the mouth to be certain that it is correct, proceed with the impression.

"Mix plaster and apply it to the plate according to previous directions; taking the precaution to rub some (with a small brush, feather, or the finger) over the roof of the mouth and around the inside of the teeth, especially between contiguous teeth, when it is desired to have accurately the impression of these small spaces. Introduce carefully, and press gently with one finger until the plaster sets. The patient should be placed in a chair having a head-rest, so as to give support during the subsequent steps. The head need not be thrown forward as the plaster sets, unless an excess has been used and is likely to drop upon the tongue.

"When the plaster is firm enough to keep its place without assistance of the finger, take an excavator or gum-lancet and with extreme carefulness trim off any excess of plaster from the sides of the teeth adjoining the spaces, also from the edges and outside of other teeth, removing with the aid of some cotton or the fringes of a napkin, all loose particles of plaster. The extent of this trimming of the plaster will depend much upon the relative position of the teeth to each other; the rule being to cut away the plaster from all accessible places where, from under-cutting or dovetailing, it will either break off or offer serious impediment to the removal of the impression. Should the bicuspids and molars of each side incline inward, as often happens, this presents a difficulty which cannot be thus overcome. If it is slight, the plate made as above described will yield sufficiently to permit removal, and return again to its shape; but if very decided, then the cross-piece of gutta-percha must be shaped so as to permit a corresponding degree of pliancy, and yet be stiff enough to guard against a permanent bending of the plate.

"Let me pause here, while the impression is still in the mouth, to call your attention to what has been thus far accomplished, with the 'how and why.' An impression has been taken of the inside surfaces of the teeth and of the gums, as far only in the narrow spaces for one and two teeth, as the inside margin of alveolus, but running over to the outside in the larger spaces. It is perfectly accurate, as only plaster can make it. It will not shrink as gutta-percha would, nor 'drag' around the necks of the teeth as wax. The elastic nature of the cup permits the slight yielding as it is withdrawn, while the cotton fibre will prevent the fractured piece or pieces of the non-elastic plaster being displaced. The impression being as yet incomplete can be withdrawn without violence or injury, which could not be done in the majority of partial cases if the plaster were continued around and in front of the teeth. It only remains to complete the impression at those points which the plaster does not cover.

"This must be done before any attempt is made to loosen the plaster impression. Behind each space of one or two teeth, and projecting above the teeth, is seen the gutta-percha plate covered more or less with plaster.

Take now an impression of this part of the plate, of the gum, and of the front and the sides of the teeth by carefully pressing a small piece of wax into the space, then remove it with utmost caution to avoid changing its shape. If between this and the next space there is only one tooth, it will be better to leave the first wax in place while taking this second impression, which must be the first one removed, since it will in part overlap the other. In cases where only two or three teeth remain, with wide spaces between, a small wax impression is taken immediately over the tooth, lapping upon the gutta-percha on either side. If the wax is too hard it will not take an accurate impression, and if too soft it will change its shape too easily in removing it. You will find it a very good plan to take a small lump slightly warmed and rather firm, and soften the surface by dipping in warm water. Gutta-percha does not answer well for this purpose.

"The next step is to remove the plaster impression. If it offers any resistance, insert a curved excavator in one side of the gutta-percha cross-strip, and with this draw it downward with a to-and-fro movement, guarding the hand so that it may not come away with a sudden jerk. Varnish the impression with a thin layer of sandarach varnish, and then adjust the wax pieces to their respective positions, fastening each with a few drops of melted wax. The model made from an impression thus taken will prove an exact fac-simile of the parts to which plate and teeth are to be fitted. But I must repeat what I have before said to you, that the nicest manipulation is necessary to success, especially in four points: First, the trimming of the plaster while in the mouth before applying the wax; second, the removal of the wax pieces so as not to change their shape; third, the removal of the plaster impressions; fourth, the readjustment of the wax pieces. If you are incurably clumsy or hasty, I advise you not to hope much from methods which will repay only the careful manipulator."

THE VULCANITE—MAY.

THE editor and publisher, in the prospectus presented in the first number of this magazine, states that it is his intention to devote its pages mainly to "improvements in *artificial dentures*, appliances for correcting irregularities of the teeth, and dental mechanics generally." The principal part of this number is devoted to matters relating to the *Goodyear Patents*, and the interests of the American Hard Rubber Company. Several valuable papers on metallurgy and dental mechanics are promised for subsequent numbers.

It will be found by the following, that another effort has been made to establish a local society in New York, and it is sincerely to be hoped that it may prove a permanent and useful organization, and eventually induce that *esprit de corps* which will enable from twenty to thirty practitioners to meet together at short notice and upon the most friendly terms, as they have been enabled to do for years in Philadelphia.

"NEW YORK SOCIETY OF DENTAL SURGEONS.—A meeting of the dentists of New York and vicinity was held at the Cooper Institute, on the evening of March thirteenth, at which preliminary steps were taken for the formation of a City Association. At subsequent meetings, a constitution and code of by-laws were adopted, and the following named gentlemen elected officers for the ensuing year:—

"*President*, A. McIlroy; 1st *Vice-President*, F. H. Clark; 2d *Vice-President*, T. H. Burras; *Rec. Secretary*, E. C. Rushmore; *Cor. Secretary*, B. W. Franklin; *Treasurer*, James T. Stratton; *Librarian*, John Allen."

THE NEW YORK DENTAL JOURNAL—APRIL.

THE management of this journal passes, after this number, into the hands of W. B. Roberts. The following obituary on DR. ALVAN BLAKESLY is taken from it:—

"It becomes our painful duty to record the death of Dr. Alvan Blakesly, of Utica, N. Y. The circumstances attending his death are of the most melancholy character. As near as we are able to learn, Dr. Blakesly left Utica about the middle of last month to recuperate his health, his system having become debilitated by constant application to business. His physician and numerous friends advised him to go South for a short time, in order, if possible, to regain his health. He stopped at a friend's a short time in this city, expressing a desire that no one should know of his being here, giving his reason that he was too unwell to see them. He took passage in one of the Savannah steamers, in company with an acquaintance of his from Utica; and, on or before their arrival at Savannah, Dr. Blakesly was missing, it being believed that he had fallen overboard and was drowned. The circumstances connected with his mysterious disappearance from the decks of that steamer may forever remain a mystery to man; but his many virtues, his companionable and gentlemanly deportment, and his efforts to elevate his profession by friendly intercourse, will be remembered by many who will ever cherish for his name the fondest recollections. It was to Dr. Blakesly's efforts mainly that crystal gold and crystal gold-foil were introduced to the profession. He was among the very best operators in this country, having but few equals. The mechanical department of his business was superintended by himself, he being a finished mechanical manipulator, taking great pride in excelling in every department of his profession. He was among our oldest practitioners, having been in successful practice for about thirty-five years. It had been our good fortune to enjoy his acquaintance for the past twenty years; and, notwithstanding much of that time his health was but indifferent, yet, under all the depressing influences of ill health and a highly susceptible temperament, aggravated by the nature of his physical derangements, he habitually maintained his peculiar urbanity of manner, and courteous and gentlemanly bearing."

SOLUTION OF THE PERCHLORIDE OF IRON.—At the suggestion of a friend, we have tried this article with decided advantage, in several cases, when troubled with hæmorrhage from the gum, attendant upon the excavation of decay from cavities running down to or below the necks of the teeth. Applying a small pledget of cotton, saturated with the preparation, to the bleeding surface, the hæmorrhage is completely arrested, and the operation of filling can be effected at once. As this is one of the most powerful astringents in the materia medica, both when administered internally and externally, it should be had recourse to in profuse hæmorrhage following the extraction of teeth. Several practitioners have already testified to its value under such circumstances.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Nitrous Oxide—its Properties and Applications.—Among other events of pre-eminent importance, the present era has seen the realization of that long dream of the past for a practical method of speedily producing general insensibility in order to obviate pain and suffering, and facilitate those mutilations of the animal organism which are unhappily so frequently necessary. The practical exposition of this great thought of the past in the discovery of the means for the production of that state of insensibility now known as anæsthesia, affords a striking illustration of the truth of the proverb that the dreams of one age become the realities of another. The general history of the development of this grand idea, from its original conception to its final culmination and practical demonstration, shows how gradually but surely knowledge progresses from one point to another through successive periods of time. All honor, then, to those who conceived the idea and those who perfected this noble discovery of anæsthesia! That to Dr. Horace Wells belongs the credit of the practical exposition of this great truth there is now but little doubt, yet it must be admitted that he was unfortunate in the selection of the particular agent—nitrous oxide—for its experimental illustration. For, notwithstanding the general belief upon the subject founded mainly upon his experiments, it is very doubtful whether this agent will produce true anæsthesia at all—the general experience of those who have experimented with it most largely being in opposition to this view. This opinion is sustained by the fact that, notwithstanding the peculiar effects of the laughing-gas upon the human system, led Sir Humphrey Davy to suggest that "as nitrous oxide, in its *extensive operation, appears capable of destroying pain*, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place;" yet they were not sufficiently striking in this respect to induce him to attempt any such practical application of his thought. This was contrary to his usual practice, for he was ever alive to the slightest opportunity for a new discovery. That the nitrous oxide does produce a high degree of pleasurable excitement, during which the mind may be so entranced as to become temporarily indifferent to, or even unconscious of, impressions made upon the organism, there is little doubt; but that it reduces the cerebro-spinal or general nervous system to a state of insensibility like that produced by those representative anæsthetics, chloroform and ether, is contrary to general experience. Indeed, this seems to prove that its influence upon the animal economy is directly opposite and antagonistic to that of such agents. In reality it differs therefrom not only in properties, but also in constitution; for they are composed largely of the elements hydrogen and carbon, while its sole and exclusive constituents are oxygen and nitrogen. Moreover, a very general analysis of its physiological properties and therapeutical influences will also show that it differs as widely in these respects from the well-recognized anæsthetics as it does in constitution. Thus, for instance, in the case of chloroform: this directly prevents aeration of the blood, if it does not also deoxidize that fluid, depresses the cerebral and general nervous system, causes relaxation of the muscular and other contractile tissues, paralyzes the heart, and thus produces death,—its tendency being, in fact, to depress the vital energies and destroy life by direct and positive sedation. Ether, on the other hand, is primarily somewhat stimulant to the brain and nervous system, less immediately active in arresting oxidation of the blood, and in producing relaxation, though ultimately depressing and destructive, much in the same way as its congener. These agents, therefore, act by preventing arterialization of the blood, depressing the nervous system, checking general cell and nutritive ction, and prostrating the vital energies. Hence the process of anæsthetization is a process of devitalization, and the anæsthetic condition a state of suspended animation artificially produced; the truth of which is demonstrated by the fact that this approximate or partial, often proceeds, notwithstanding the utmost care, to complete and absolute death. These agents are therefore positive and powerful sedatives.

Between the constitution and properties of the respective agents just considered in common with all the other well-known sedatives and anæsthetics and the nitrous oxide there is a wide difference. Thus, for instance, instead of producing sedation and insensibility, it, on the contrary, usually augments general and special sensibility, both during and after its administration. Moreover, instead of retarding, it increases both directly and indirectly, the oxidation of the blood, stimulates the cerebral, nervous, and muscular organs, promotes contractility and general cell and vital action, and thus invigorates the whole system and acts as a true tonic. Its effects in these respects are, indeed, so well marked as to place it in direct antagonism to the various sedatives and render it very efficient in not only counteracting their effects by stimulation, but also to some extent to act as an antidote thereto. My own observation, experiments, and experience have taught me that this agent—variously designated nitrous oxide, protoxide of nitrogen, or laughing-gas—is a direct, potent, and permanent chemico-organic, arterial, nervous, cerebral, and general stimulant, diuretic, aphrodisiac, and antitoxic; and is thus a valuable tonic, secernent, resolvent, alterative, antidote, etc. etc.

These remarks might be greatly extended and much evidence presented in support of the views advanced, but as that would lead to a discussion of many points not so pertinent to the objects of this journal, we refer those interested to Sir Humphrey Davy's work on Nitrous Oxide, and to the several essays by the writer, respectively entitled Zoo-adynamia; Antidotal Applications of Nitrous Oxide, *Boston Medical and Surgical Journal*, vol. xlvi., No. 14; Anæmatosis—its Consequences, Prevention, and Treatment, *ibid.* vol. xlvi., Nos. 22 and 23; Experimental Investigations on the Antidotal and Revivifying Properties of Nitrous Oxide, *ibid.*, vol. xlvii., No. 19; Hæmatosis—its Natural and Artificial Induction, *ibid.*, vol. xlix., Nos. 3, 4, 5, and 6; Glucosis, *ibid.*, vol. l., No. 11.

"*Study of the Parotid Gland.* By M. CLAUDE BERNARD.—We have continued the series of experiments which we commenced on the motor nerve of the parotid gland. Our observations on it have been made without much difficulty on the present occasion—the natural consequence of our having previously discovered by dissection, during our first experiment, that it is a branch of the auriculo-temporal nerve. Now, you are perfectly aware that this branch of the fifth pair of nerves has innumerable anastomosing branches emanating from the filaments of the facial nerve. It is, therefore, evident that, far from contradicting the results of our experiments on the section of the facial nerve during our researches on it in the interior of the cranium, this last observation only goes to confirm them. The nerve which animates the parotid gland and presides over its secretion must consequently be one of the anastomosing branches furnished by the facial to the superficial auriculo-temporal nerve. On a level with the condyle of the jaw this latter furnishes a small branch, which pursues its course alongside the internal maxillary artery; but following a direction the inverse of that of the current of the blood: it then enters the parotid gland, where it ramifies freely. It is this bundle of nervous filaments which we must henceforth consider as the motor power of the parotid gland; and we must completely extirpate them in our dissection if we desire to arrest the secretion. The same results have been obtained in the course of our experiments on two other dogs.

"The discovery of the properties of this bundle of nerves presents under different points of view no small amount of interest. Call to mind the opinions which were formerly in vogue with reference to the parotid gland; it was regarded as absolutely passive in the act of insalivation; it was regarded by all physiologists as a kind of sponge, which the movements executed by the animal during mastication must have pressed in order to make the saliva flow. It is true that the gland was observed to become active during the trituration of alimentary substances, and no nervous filament was recognized the direct excitation of which was supposed to stimulate the secretion; the conclusion, therefore, seemed to be quite legitimate. To-day, you must observe, this opinion is no longer admissible; for during our galvanization of the nerve, this filament, which is no longer serviceable (seeing that it is cut,) does not give rise to any pain; no movement is produced; the jaws are motionless: it is not, therefore, to mastication that we are to attribute the flow of saliva which follows the galvanization; here there is an important fact which science has acquired.

"The parotid gland does not play an absolutely passive part in the insalivation of aliments.

"But this discovery may be turned to advantage in a more general point of view in our study of the circulation of the glands. The mechanism of the secretion was formerly explained by a hypothesis founded on purely mechanical grounds; the pressure of the blood in the vessels which lead to the glands was supposed to determine through their sides a transudation which was believed to pour into the acini a special product for each of the secreting organs. Ludwig has clearly demonstrated the inadmissibility of this hypothesis; he proved that an amount of pressure much more considerable than that occasioned by the circulation of the blood could be applied to the glands without exciting in any way the activity of their secretion. He adapts a manometer to the excretory duct of the submaxillary gland, he then ties this canal so as to completely prevent the escape of the secreted products; he at length excites, by means of galvanism, the motor nerve of the gland, that is to say, the chorda tympani; operating in this manner, we obtain, by the accumulation of the saliva, a pressure which raises the mercury to thirty or even to forty centimetres; this pressure is evidently directed in an inverse sense to that exercised by the blood; nevertheless, the secretion goes on uninterruptedly. The secretion of glands is, therefore, not due to a simple mechanical cause;

and it is this which the rational study of the circulation in the minor vascular systems corresponding or communicating with the secreting bodies demonstrates.

"While the gland remains in a state of repose, its venous blood is black; but no sooner does it begin to act, than its blood becomes red, and like that of the arteries, and when the vein is cut, the blood is remarked to issue forth in jerks, as if an artery had been cut. It seems, therefore, at first sight, that the circulation of the gland is accelerated, and that the secretion is the result of this new modification; but these conditions alone do not suffice to determine the physiological phenomenon; it is still necessary that nervous action should come into play. When we excite the secretion by sensations produced by moist substances, it becomes very difficult to decide between the part played by the circulation in the interior of the gland and that which is produced in the surrounding parts; the animal executes movements of deglutition, moves the jaws, and thus causes the blood to flow from all sides toward the vessels of the gland. Nothing of the like kind takes place when we apply direct excitation, by means of galvanism, to the motor nerve. The animal experiences not the slightest sensation; he remains motionless, and the circulation proceeds with the most perfect regularity. It is then that the observer is placed in excellent conditions for studying it. We have already adopted a method of procedure, as regards this subject, in the case of the submaxillary gland, but it has been impossible for us, up to the present moment, to repeat the experiment on the parotid, and it is especially with a view to this object that we have undertaken a search for the motor filament of this latter gland; for, if it were possible to compare, loupe and scalpel in hand, the act of secretion which takes place in two different glands, such, for example, as the parotid and the submaxillary, and to apprehend, at a glance, the difference and the analogy existing between them, an immense step would thus be made toward the discovery of the real essence of this important physiological function.

"The study of the properties of this nervous filament is fraught with interest in other respects; we know, for example, that by injecting into the torrent of the circulation certain substances, camphor for instance, the salivary secretion is powerfully excited; this is a subject which it is our intention to investigate, and especially for the purpose of ascertaining the nervous action which may determine it.

"Formerly, during my investigation of the subject of diabetes produced by lesion of certain parts of the encephalon, I proved that a well-marked salivation could be produced in an animal simply by wounding certain definite points. The wound which determines these accidents in the economy must be made on the floor of the fourth ventricle. Now when the cutting instrument chances to deviate to the right or the left, instead of acting directly on the median line, there is observed to take place a diminution in the flow of saliva from the gland of the same side; but when the wound is made directly over the median line the flow is the same on both sides.

"We have also remarked that the submaxillary gland furnishes more saliva than the parotid. To what is this difference to be attributed? The wound, as we stated, is made on the floor of the fourth ventricle, but the salivation takes place only when the point of the cutting instrument, being directed forward, wounds the parts adjoining the origin of the fifth pair of nerves. It would appear, therefore, that an injury bearing directly on the nervous centre, which presides over the salivary functions, immediately gives rise to the secretion dependent on it; in fact, we know that it is through the medium of the fifth pair of nerves that most of the reflex actions are produced, which exercise on these glands such a powerful influence; in this nerve may be said to terminate the greater part of the gustatory impressions which may be called the ordinary scurce of the salivary flow. We have frequently repeated an experiment which goes to confirm the truth of what we have just stated. Cut the lingual nerve, galvanize its peripheric extremity, no result follows; give vinegar to the animal, still no effect is produced; the nerve which should transmit the impression being divided. But if you galvanize the other extremity of the nerve, thus acting directly on the nervous centre, you will produce a secretion similar to what is observed under ordinary circumstances; but if, instead of acting on the nervous centre by galvanization of the lingual nerve, you irritate directly the nervous centre itself, you will then produce a salivary diabetes, if I may be allowed to use such an expression.

"But, in addition to this, there exists certain poisons which act directly on the salivary glands; woorara, for example, which, as you know, kills very rapidly, by producing phenomena characterized by general paralysis, induces at the same time an abundant flow of saliva, which is to be explained, no doubt, by the complete relaxation which it produces in the entire glandular tissue.

"It may be objected that the asphyxia which this poison causes of itself suffices to explain the phenomenon: in order completely to solve the question, I injected some woorara into one of the small arterial branches which anastomose with the artery of the gland, at the same time taking care to open all the veins. In this way I poisoned the acini of the gland without poisoning the animal; I thus obtained a flow of saliva which it was impossible could have been produced by any other cause than the woorara.

"Woorara acts, therefore, on the *salivary* glands in the same way as it does on the other glands of the economy. Now, we are aware that this toxic agent acts especially on the extremities of the motor nerves; but how does this action on the extremities of their nerves affect the glandular bodies themselves? This is a difficult question, which we shall endeavor to solve at some future time. It has been our object, on the present occasion, merely to show you that a nervous centre presides over the salivary function. Having shown you that a permanent salivation may be produced in animals by artificial means, it follows that there exists a special nerve whose duty it is to preside over the action of each of the glands; and the discovery which we have recently made completes the series of proofs on which this doctrine is founded."—(*Med. Times and Gazette*, April 14.)

"*India-Rubber for the Making of Artificial Jaws and Palates.* By GEORGE PARKINSON, M.R.C.S.—The *Medical Times and Gazette* for the week ending April 28th, details the history of a case of cleft palate, which had been successfully treated by the application of an artificial palate made of vulcanized india-rubber. Having had considerable experience in supplying the deficiencies occasioned by fissures in clefts in the palate, and in substituting portions of artificial jaw in cases where the patients had undergone partial excision of that part by the surgeon, I am anxious to add my testimony to that of Mr. Elliott, feeling convinced of the great advantages which india-rubber possesses over gold, or any other material which is at present in use in the profession. The following illustrate well the applicability of this remarkable material:—

"CASE 1.—Miss H. suffered from congenital fissure of both the hard and soft palate. The gap was so wide as to place the case quite beyond the reach of any surgical assistance. She had worn a gold palate for many years with tolerable comfort, but the loss of some of her teeth, and the consequent alteration of the shape of the upper maxilla, rendered her artificial palate almost useless. She at this time applied to me, and I fitted her with a palate of vulcanized india-rubber, which, for its extreme lightness, has caused the patient much comfort. Her powers of deglutition and speech have also much improved. This case has stood the test of many months, and may, therefore, be considered as permanently successful.

"CASE 2.—Mr. A. had been successfully operated on by Mr. Fergusson for congenital hare-lip and fissure of the palate. The cleft in the hard, however, still remained, and he was referred to me for the purpose of having a gold palate fitted to the gap. Having had already success in the application of the india-rubber, I used it again for this patient, and the result was such as to afford both the patient and myself the greatest satisfaction. The immediate improvement in the speech of this patient was most remarkable.

"CASE 3.—Miss B. had previously had the soft palate successfully closed by Mr. Fergusson, but suffered great inconvenience from an aperture in the hard palate about the size of an almond. To this case I applied the vulcanized india-rubber with the most complete success.

"CASE 4.—Miss H. had been operated on by Mr. Christopher Heath for hare-lip and fissure in the soft palate with most perfect success; but a small aperture in the hard palate still remained, which caused great imperfection in speech. The improvement in talking was greater in this patient after the application of the india-rubber than in either of the preceding.

"CASE 5.—Miss W.; congenital fissure of both hard and soft palate, far too extensive to allow of surgical interference. I applied an india-rubber palate, which rendered speech and deglutition easy and natural.

"CASE 6.—Miss H.; a similar case to No. 5, and attended with an equally satisfactory result.

"CASE 7.—Miss H.; the soft palate had been successfully closed by Mr. Fergusson, but a considerable cleft remained in the hard. I here also used the vulcanized india-rubber with a success equal to any of my other cases.

"CASE 8.—Eliza C. was operated on by Mr. Fergusson, in May, 1856, when the greater part of the left upper maxilla was removed. As soon as the cicatrix had become sufficiently firm to bear pressure, I supplied the deficiency by a frame of vulcanized india-rubber, attaching to it those teeth which had necessarily been removed by the operation. The extreme lightness of the india-rubber rendered it most useful in a case of this kind; and the great comfort which it has afforded the patient has induced me to adopt a similar proceeding in other cases of this nature which have since come under my notice."—(*Ibid.*, May 19.)

"*On the Action of Hypochlorite of Lime on Sulphur, and the Employment of a Mixture of these Bodies for the Vulcanization of*

India-Rubber. By M. Gaultier de Claubry. (Comptes Rendus).—Mr. Parkes, of Birmingham, first made known the curious fact that caoutchouc in contact with very small quantities of chloride of sulphur dissolved in any convenient menstruum, sulphide of carbon, for example, became vulcanized at the ordinary temperature. This process allows of the vulcanization of many objects on which it would be impossible to operate at a high temperature, such as very thin sheets of caoutchouc, or woolen garments, or silk fabrics dyed in colors which cannot resist a great heat. Mr. Parkes also pointed out the precautions necessary when thick pieces are operated upon; but whatever care may be taken, it is easy to see that it is almost impossible to obtain in this way products equally vulcanized.

"Mr. Parkes has pointed out another way by which a better effect is produced, which consists in mixing with the caoutchouc paste what he calls *dry chloride of sulphur.* This name can only be applied to flowers of sulphur impregnated with chlorine, and by means of this mixture india-rubber can really be vulcanized in the cold, and the greater part of the sulphur remain in the state of simple admixture.

"The analysis of a great number of vulcanized objects having revealed the presence of chloride of calcium, it occurred to me that this salt might come from hypochlorite of lime which had been used in the caoutchouc paste to produce the chloride of sulphur necessary for vulcanization, and that it was such a mixture which Mr. Parkes used. The following facts prove beyond doubt that it may be employed for the purpose.

"If we simply shake flowers of sulphur and dry hypochlorite of lime together at the ordinary temperature, the two are scarcely in contact before a strong smell of chloride of sulphur is manifested. If the two be rubbed together in a pestle and mortar, the temperature of the mixture rises, the sulphur becomes soft, and the whole agglutinates into mass with the abundant evolution of vapors. When the sulphur is greatly in excess relatively to the hypochlorite, the mixture of the two bodies should be made without rubbing; it may then be added to the caoutchouc paste with or without the addition of other substances, such as chalk, zinc white, etc., and the vulcanization may be effected either at the ordinary temperature, or at a gentle heat. By this process it is possible to obtain india-rubber of any thickness uniformly vulcanized.

"When sulphur is mixed with a large excess of the hypochlorite of lime by merely shaking the two together, the temperature quickly rises very high and strong action takes place, therefore the mixture must never be made in a close vessel."—(*Chemical News*, May 26.)

"*Two Cases of Interstitial Keratitis with Teeth of the Heredito-Syphilitic Type.*—(Under the care of Mr. Stanley.) Any one who has access to St. Bartholomew's Hospital, and who is desirous to make himself acquainted with the dental malformations indicative of hereditary syphilis, may examine two typical examples of them in patients now in Darker Ward. Both the patients are boys, aged fifteen, and both are under care for interstitial keratitis. According to the views now entertained at the Ophthalmic Hospital, this form of inflammation of the cornea occurs almost solely in the subjects of inherited syphilis, and it is a matter of established clinical observation, that those who suffer from it almost invariably exhibit remarkable peculiarities in their teeth. Occasionally it occurs before the second dentition, and then the teeth are no guide in diagnosis, as the peculiarities are manifested only in the permanent set. The malformations to which we refer mostly affect, in greater or less degree, all the incisor and canine teeth of both jaws, but the central incisors of the upper jaw are those most commonly and most peculiarly modified. These latter may indeed be regarded as the test teeth in reference to this question, and any one not familiar with abnormal dental types will do well to confine his attention to them in attempting to establish a diagnosis as to inherited syphilis.

"Our immediate object in alluding to this subject at the present time is simply to draw attention to Mr. Stanley's two cases, for it is not often that such well-marked ones are met with in the wards of our general hospitals. At the ophthalmic hospitals syphilitic teeth may be seen every day, but it is because their subjects are brought there on account of the keratitis from which they usually suffer at or near the period of puberty. The following are brief particulars of the cases to which we refer. It will be seen that we have not been able to obtain any history from the patient in either instance. It is, however, one of the great advantages of a knowledge of the typical form of teeth, that it enables its possessor to dispense with the necessity for asking direct questions, which always occasion annoyance, and are usually answered without any regard to the truth.

"CASE 1.—*Double Interstitial Keratitis of much Severity at the Age of Thirteen. Characteristic Teeth. History of Eye Disease of an Elder Sister.*—W. L., aged fifteen, is a tall well-grown lad. The bridge of his nose is not much widened or sunken. His forehead is slightly protuberant, and his face shows patches of psoriasis. His palate is very high and narrow. He is rather deaf. He states that he is the second of three children. An elder sister, aged eighteen, has suffered from 'bad eyes,' and is now quite blind of one. A younger sister, aged thirteen, is believed to be in good health.

"*State of Eyes.*—Both corneæ are extensively opaque by the interstitial deposit of lymph. They are also, as is not unusual after a long and severe attack, thinned in the centre, and pushed forward so as to be more convex than is normal. The disease is now slowly subsiding, and the clouds of opacity are gradually being absorbed. The left eye was the first attacked, and its fellow began to inflame about eighteen months ago. The right was not affected until three months later, but they have since suffered with almost equal severity.

"*State of Teeth.*—The central upper incisors are very peculiar indeed, and are of the form most unmistakably typical. Instead of becoming wider from side to side as they project downward, they are narrowed and their corners are rounded off. In the centre of their cutting edge is a deep vertical notch which is prolonged upward as a shallow groove in the middle of the front surface of the tooth. The teeth are carious at their necks. The lateral incisors are so much destroyed by caries that their original form is not recognizable. The lower teeth are all of good form, with the exception of the central incisors, which are narrow, peg-like, and notched.

"CASE 2.—*Double Interstitial Keratitis at the Age of Twelve. Syphilitic Physiognomy. Characteristic Teeth.*—George M., aged fifteen. This lad is of pale complexion, broad, sunken nose, and flabby skin. He is the eldest living of a family of five—two older than himself having died in infancy (one at six months and one at two months.) He has suffered for several years from purulent discharge from both ears, and is now partially deaf.

"*State of Eyes.*—His right eye was first attacked about three years ago, and the left some time subsequently. The left cornea appears never to have suffered so severely as the other, and is now clear, excepting a slight haze in its lower part. He can see to read with the left, but is troubled with muscæ and black spots. The right cornea is still very extensively diseased, the masses of deposit being unusually large and dense.

"*State of Teeth.*—The central upper incisors present each a broad notch in their cutting edges. They are not particularly narrowed, and though not nearly so peculiar in form as those in William L.'s case (see above,) they still present the same feature (an atrophy of the middle lobe of the tooth-edge,) and are sufficiently characteristic. The lower incisors are serrated, but not much notched.

"Among Mr. Dixon's out-patients at the Ophthalmic Hospital there are at present many very good examples of the syphilitic type of teeth in conjunction with interstitial keratitis. In one instance three children (a sister and two brothers) are all affected by the same form of disease, and all present the same type of dental abnormities. It is most interesting, however, to observe the gradations in severity according to the age of the patient, both in regard to the eyes and the teeth. The girl is the eldest living of the family, and her teeth have suffered most severely, while her countenance is repulsively deformed by the effects of infantile syphilis, her forehead being protuberant, bridge of nose level with cheeks, large scars at angle of mouth, etc. Her next brother presents characteristic teeth, and has suffered a well-marked attack of keratitis, but his physiognomy is not very peculiar, while the third presents, both as regards eyes and teeth, a still less well-marked condition of things. They have three younger brothers who are reported healthy. The history given is that both father and mother went through the ordinary course of constitutional syphilis and mercurial treatment soon after marriage, and that their two eldest both died in infancy of inherited disease. The girl (their third) is stated to have suffered severely from the usual symptoms in infancy, but got through them. Neither of her brothers are remembered to have had anything noticeable in infancy. It is worthy of remark, in relation to the following case, that the girl is deaf, partially paralytic in her right arm, and almost an idiot as regards intellect."—(*Med. Times and Gaz.*, June 9.)

"*Development of the Teeth of Cattle, and Mode of ascertaining their Age by the same.*—Persons acquainted with the dentition of 'neat stock,' can form a pretty accurate idea of age, from the period of birth up to that of adult life; and this method of ascertaining the age of an animal is, probably, more correct than that which applies to *horns;* for by means of a rasp applied to the rings of the horns, any amount of imposition may be practiced, when it is well known that the same liberties are not to be taken with the teeth without the chances of discovery. It is possible that there may be some slight variations from the following rules, in the development of the teeth, yet such variations will not embrace a period of over a month or six weeks, which at maturity does not amount to much, and may be considered as purely accidental—out of the ordinary course of nature. The front teeth, or temporary incisors, are found in the lower jaw; there are eight of them, all prominent at the age of four weeks. The calf is usually born with three temporary grinders or molars; the fourth appears six months after birth; the fifth appears at the age of fifteen months; and the sixth is to be seen at the age of two and a half years; now, the animal has a 'full mouth' of temporary teeth, numbering thirty-two. At this period a very remarkable change in the teeth is about to occur; the temporary ones, having answered the purposes for which they were intended, are to be removed in the following order, so as to give place to others which shall correspond to the increase in the size of the jaw bones, and proved as durable as other bones of the body. At the age of two years, the central or middle incisors (lower jaw) are shed and replaced by two permanent ones. At the age of three, the two incisors known as the inner middle, undergo the same process. At the age of four the outer middle are shed, and replaced by permanent teeth. At the age of five, the corner incisors are also transformed in the same manner, and the animal has a full set (eight) of permanent front teeth. The first and second permanent molars, known as grinders, appear in the upper and lower jaws, on each side, at the age of two years; and at intervals of one year, the other four are successively cut; so that at the age of six years, the animal has a 'full mouth' of permanent grinders."—(*Am. Stock Journ.*)

"*Return of Sensibility after Section of Nerves.* By Dr. Lotzbeck, of Tubingen.—The author has devoted himself to minute researches on the return of sensibility in five cases of the division of nerves, three of which belonged to the inferior maxillary, the other, to the infraorbital. In four cases a portion of nerve more or less had been exsected, and in one case simple section only was performed.

"In all the cases, the operation had been followed, within the sphere of distribution of the divided nerve, by a diminution of, or total insensibility to, touch, and the perception of temperature; this modification of sensibility has been complete, either immediately after the operation, or from twenty-four to forty-eight hours subsequently, or at most only twelve days.

"The diminution of perception of temperature is sometimes proportioned to the abolition of tactile sensibility, and makes the same progress; sometimes it continues even when the tactile sensibility has already perceptibly diminished, and does not disappear entirely until a subsequent period.

"The diminution of tactile sensibility is accompanied by the following particulars: the patients perceive more slowly and with less precision the part that is touched; besides, in order to produce a double impression, it is necessary that the two points of a compass, placed in contact with the skin, be farther separated than in the normal condition, and that the distance which it is necessary to leave between the two points be gradually increased.

"In all the cases observed, a return of sensibility, more or less perceptible, has been verified. This phenomenon has, moreover, exhibited wide variations in the different cases; this has been observed sometimes after some days, sometimes after the lapse of a much longer period; sensibility may be restored in the entire extent of the integument where it had disappeared, or only within circumscribed limits; sometimes it returns to its normal level, sometimes it remains weak.

"The return of the perception of temperature proceeds generally, and with almost trifling variations *pari passu*, with the restitution of tactile sensibility; but in one case, this latter was almost restored to its normal state, while the perception of temperature was altogether absent.—(*Deutsche Klinik; Gazette Hebdomadaire; New York Med. Press.*)

MISCELLANY.

In a letter to the *Med. Times and Gazette* for May 12, upon the nature of death from chloroform, and its relative frequency from small and large quantities in minor and major surgical operations, Dr. Chas. Kidd presents statistics to show that it is more dangerous in the former than the latter. He says: "There have been about one hundred and twenty-five deaths from anæsthetics in Europe up to the present date. A very large number, the only list of any such cases on the Continent, is one by M. Scoutetten, an army surgeon, who gives forty deaths, but unfortunately does not specify the nature of the operation for which the anæsthetic was administered. Dr. Snow gives fifty deaths, and I have since myself made out thirty-five deaths in addition. All agree as to the vast preponderance, however, of deaths in male patients rather than in female; it also appears that while there have been in reality no deaths as the result of large amputations, resections, ovariotomy, etc., fully two-thirds of the deaths have been from operations on sphincters or tendinous sheaths, strabismus, tooth-drawing, etc."

He further observes: "The general result is very curious, and, I think, very convincing, that in the hundreds of thousands of operations where chloroform has now been used, it has proved in the vast majority to be perfectly safe, and that it is safer in large than in small operations."

In the accompanying table of the various operations in which death followed anæsthetization, it is mentioned that from four to six fatal cases occurred in the extraction of teeth.

In discussing the relative frequency of death before, during, and after operations, from different anæsthetics, their combination and modes of administration, he states: "A very large number of the twenty-five deaths from the use of anæsthetics after operation, have been deaths from the effects of the slow administration of ether, or ether and chloroform mixed, but not from pure chloroform. I published nineteen deaths from ether two years ago, yet it is still suggested in America that there have been no deaths from this agent. Scoutetten gives five; and since then there have been at least four or five more from ether or amylene; so that, on the whole, there appears at present about a hundred deaths from pure chloroform, and one-fourth (or twenty-five) from ether or amylene. Next, as to the stage or degree of the anæsthetic process which appears most dangerous, this (contradictory though it seems) is decidedly the stage of excitement, or the early stage of violent plunging, before the patient is rendered anæsthetic and fit for the operation he is about to undergo. This escaped the knowledge of Dr. Snow."

In relation to the time and mode of death, comparative danger in large and small operations, degree of tolerance of the chloroform in different states, etc., Dr. Kidd makes the following general remarks: "I think it will be found that the mode of death by 'fits,' trachelismus, syncope, etc., observed before operations, occurring suddenly, and consequently the means to be adopted for resuscitating patients in such accidents, differ very widely from the mode of death observed and means to be adopted for resuscitation of patients who show a tendency to sink after operations (by asphyxia?). We have hitherto confounded the two, and have been looking for some one great secret cause of these most melancholy occurrences. One set of accidents seem to occur suddenly from chloroform; the other slowly, but from ether. It appears also very instructive and consoling that in all the large, tedious operations—such as resections, large amputations, midwifery, ovariotomy, ligatures of large arteries, etc.—such is the 'law of tolerance' of chloroform, that in these formidable operations it is almost free from danger; whereas, in trivial operations (where, fortunately, we might use Dr. Arnott's congelation plan) the chances of accident are very serious indeed."

The Paris correspondent of the *Lancet* writes that "**Prof. Nélaton** lately removed two cancers of the tongue by the écraseur, and one of the patients has since left the hospital. The greatest surgical curiosity has been the removal, by M. Nélaton, of a large tumor situated at the left side of the face and covering the whole of the neck, hanging down over the chest, and reaching as far as the fourth rib. The patient is a man of thirty-five, who had five years ago a small tumor in the same region, which was removed; but it soon returned, and, making rapid progress, reached such a huge size that, unless removed, it would have proved fatal by causing asphyxia. Its measurement was, from the parotid on the left side, near the angle of the ramus of the left jaw, seventeen inches; its circumference above ten inches. The nature of the tumor was what French surgeons call ganglionic, meaning simple hypertrophy of the lymphatic glands; while M. Robin designates it ganglioma, taking it to be a kind of encephaloid. M. Nélaton removed the greater part of the tumor, and to the rest he applied caustics. The patient is doing well."

In another letter the same writer states that "the anæsthetic properties of the bromide of potassium have been turned to good account by M. Guersant, surgeon to the Hôpital des Enfans Malades, in the performance of operations in the neighborhood of the throat and pharynx, and more especially in that of staphyloraphy in the case of children. This practitioner has found that the administration of this salt in subdivided doses, to the amount of ten grains daily for a certain period, will produce a state of anæsthesia, more or less complete, in the parts concerned in the above-mentioned operation, rendering the employment of chloroform unnecessary, and still giving the surgeon the benefit of his patient's co-operation."

In the course of an interesting paper "on the scrofulous conformation, or diathesis based principally on the study of the skeleton," read before the Royal Med.-Chir. Soc. of London, and published in the *Lancet* for June, **Dr. T. G. Hake** presents, among others, the following propositions:—

"The fœtal cranium, during the early weeks of embryonic life, has a conformation approaching to that of the Ethiopian type; at the twelfth week, or thereabouts, to the Mongolian; it afterwards attains by degrees to that of the Caucasian, and it is, for the most part, among the rudimentary forms of this latter that the scrofulous conformation is to be identified after birth. * * * * * * The jaws and the teeth are marked by characters of a fœtal type in subjects of the scrofulous conformation. The jaws are frequently prognathous in strumous habits; the teeth project, and are with difficulty covered by the lips. In an anencephalous fœtus in Guy's Museum the muzzle is prognathous."

In a letter to the above-named journal, **Mr. Henry Bird** gives the following list of common deodorants: "1, Burnett's chloride of zinc; 2, permanganate of potash; 3, protochloride of iron; 4, sulphate of protoxide of iron; 5, sulphate of alum; 6, sulphate of alum and sulphate of iron; 7, sulphate of iron and common salt. These all appeared to act in nearly the same manner upon sewage, and sulphate of iron and alum seemed to be the most efficient. When the smallest quantity of chlorine was added to either of these solutions the smell immediately disappeared. As no danger of poisoning can accrue from using even a strong solution of sulphate of iron and alum, and as it acts as well as, if not better than, the other deodorizers, it ought to be adopted in preference to lime, zinc, and all others; besides being the cheapest of all."

In relation to the early decay of the teeth, a writer in the same journal states that "the Report of the Birmingham and Midland Counties Dispensary for the Diseases of the Teeth points out the astonishing fact that of 1952 operations undertaken, no less a number than 1494 were performed upon patients under the age of twenty years; and that out of the same number of operations, 1217 were upon the most valuable teeth in the head—namely, the molars, or masticating organs."

In the course of some clinical remarks upon paralysis connected with dentition, PROF. F. H. HAMILTON observed (*American Medical Times*,) that "infantile paralysis occurs generally at some time during the period of first teething, and seems to have a more or less direct connection with this process. There are several periods in life in which the system or portions of the system undergo remarkable changes, and great nervous derangements are apt to ensue. The period of the first dentition is one of these, and among the consequences of the nervous disturbances occasioned by the development of the teeth are convulsions, hydrocephalus, diarrhœa, and paralysis. The other periods to which I allude, are puberty in both male and female, and 'the change of life,' or the period of cessation of the menses, in the female. I think that I have observed, also, that at the period of 'change of life' in the male, paralysis and cerebral apoplexy are exceedingly liable to occur."

In a notice of DR. CARNOCHAN'S "Contributions to Operative Surgery and Surgical Pathology," the editor of the *Charleston Med. Jour.* disputes his claim for priority in the performance of the plastic operation for the restoration of the upper lip in this country. He fortifies his position by the relation of the following interesting case: "On the 28th April, 1858, we had occasion to manufacture a pair of lips for a lady aged eighteen whose face had been attacked two years before by lupus exedens, which rapidly destroyed the nose, and both lips, extending also upon the cheeks. When its ravages had been checked, it healed up, leaving the entire anterior surface of the face a cicatricial surface. A small depressed opening in the face was all that remained of the nose, while an unyielding cicatricial rim limited the mouth, exposing both rows of teeth and gums, and tying down the jaws to such an extent as to exclude the use of all solid food, and compel the sustenance of life by suction. Intense and continued suffering was caused by the constant exposure of the teeth to desiccation and changes of temperature. By making an X-incision across the centre of the mouth with its arms extending on a level with the remnants of the nose and down upon the chin, connected with four horizontal incisions running off from the extremities of these lines into the cheeks above and upon the chin below, four irregularly quadrilateral flaps were dissected up and brought together on the median line so as to cover the rows of teeth and release the jaws from their long confinement; thus forming two very decent lips. As the flaps contained much cicatricial tissues, the result was not as perfect as we could have wished, but was sufficiently so to add very much to the comfort of the patient; protecting the previously exposed teeth, and relieving her from the constant toothache with which she was previously annoyed; allowing her to retain the saliva which was formerly escaping constantly from her mouth, to speak with more clearness, and to enjoy the pleasures of the table. This case is only mentioned to show that Dr. Carnochan has no claim to the introduction of this operation into the United States, and no doubt cases could be found of similar operations of a much earlier date."

In the record of the proceedings of the Boston Soc. for Med. Improvement in the *Boston Med. and Surg. Jour.* (June 14th,) it is stated that Dr. Warren reported the following case of dangerous asphyxia resulting from the displacement of artificial teeth during etherization. "He lately had occasion to etherize a lady, thirty-five years old, in order to examine a painful tumor of the leg. She came quietly under the effects of the ether, but did not rouse afterwards. The pulse was good, and there were no symptoms of dyspnœa. She gradually became purple in the face, was quite insensible, and seemed to be passing into a dying state. Introducing his fingers into the mouth, in order to draw the tongue forward, Dr. W. found a complete set of upper teeth, attached to a gold plate, deep in the fauces. This was removed, the fauces irritated, the patient rubbed, etc., and at last vomiting was brought on, and she revived. She soon became violently delirious, uttering shrill cries, and beating herself, for an hour and a half. For the next two hours she was in a croupy state, from the violence of her efforts, but in the course of the evening she gradually recovered, though she remained hoarse for two days. Dr. W. observed that the accident was one likely to occur under such circumstances, and showed the expediency of removing artificial teeth before proceeding to etherize a patient.

"Dr. Parks alluded to a case which he had already reported to the Society, in which a patient experienced severe symptoms of suffocation, caused by unconsciously swallowing a set of false teeth, during sleep, which had lodged behind the glottis. The symptoms were immediately relieved by the removal of the foreign body."

In the course of an instructive paper upon the pathology and treatment of erectile tumors, in the *Chicago Med. Jour.* for June, Dr. Brainard thus notices the effects upon the salivary gland of the injection of iodine into one of such, situated on the anterior part of the thigh. "I threw into one of these tumors two grains of iodine and six grains of iodide of potassium in two drachms of water. The injection was made with Anel's syringe through a small exploring trocar introduced to the centre of the tumor. Almost instantly the patient began to spit, and continued discharging saliva freely during three days, complaining all the time of a bitter taste in his mouth. The tumor, after the operation, became more tense, and warmer than natural, and after the fifth day contracted below its former size, and was flaccid. Encouraged by these results, I repeated the injection a second time, one week after the first, with the same results in every respect.

"The declining state of the patient's health was the only cause why the treatment was not persevered in. The solution in this case passed directly into the circulation, producing instantaneous iodine ptyalism, and was not retained in the tumor as it should have been."

In illustration of the irritative effects of perchloride of iron when injected into such tumors, Dr. B. adduces, among others, the following case.

"Mr. Follin read to the Society of Surgery the report of a case of erectile tumor of the face, affecting the gums, lips, cheek, etc. Injections of the perchloride of iron were made into the lip at two different points. The immediate effect was the production of hard knots at each point. In five days the lip was very much swollen ; one of these points suppurated, and at the end of a month no trace of either remained. Several injections into the substance of the gums and the veil of the palate where the parts were diseased, resulted in ulceration in three days."

The *United States Journal* says that "aluminum is being employed in making bronze for cannon, in constructing philosophical and other instruments, etc. But while the new metal perfectly resists most acids, and certainly all ordinary ones, as well as sulphur, its value is likely to be lessened by the fact, if it be such, now reported, that it is readily corroded and crumbled by the contact of pure alkalies." It also states "that a perfect imitation of silver, it is said, is made by alloying 30 parts nickel with 20 or 30 of silver, and enough of copper to make 100 parts. It will be strange, however, if the weight be exact."

In an interesting article on aluminum in the *Scientific American*, (May 26th,) it is stated that "some of the alloys of aluminum have very remarkable properties, especially the aluminum bronze, composed of 90 lbs. of copper to 10 of aluminum. This alloy is stronger than the best wrought iron; it may be cast, hammered, or rolled, and it resists the corroding action of the atmosphere, nearly if not quite as well as gold. Besides these properties, it is of a beautiful yellow color, and is susceptible of a very fine polish. Alloys of aluminum may be obtained by the decomposition of alumina by carbon, in contact with certain metals electro-positive in relation to aluminum—for instance, copper and iron. E. L. Benzon obtains an alloy of aluminum and copper by the following method: Alumina, animal charcoal, and copper, (either the simple metal or the protoxide or peroxide,) all finely pulverized, are thoroughly mixed together in proportion to their atomic weights, and placed in a melting pot similar to the pots in use for cast steel. The mixture, covered with charcoal, is exposed to a strong red heat, nearly sufficient to melt the copper, until the aluminum is reduced to the metallic state. The heat is then augmented for half an hour or an hour, until the metals are thoroughly melted together and a perfect alloy obtained."

The Chemical News says that "Professor Boettger has made the following curious observations. When dry oxide of silver is damped with essence of cloves, the mixture takes fire spontaneously and the oxide is reduced to the metallic state. The same takes place with peroxide of silver obtained by electricity, and with oxide of gold. With peroxide of lead and chloride of lime the essence becomes heated and evolves smoke. It has no action upon permanganate of potash or on oxide of mercury. The hydrocarbon oils that this essence contains when separated from the eugenic acid it also contains, do not act upon the above substances in the same intense manner."

The same publication contains the following remarks on the solubility of silica in alcohol mixed with hydrochloric acid: "Winkler observes that when Portland cement, slag from furnaces, olivine, or other pyrogenous silicates in fine powder are added to alcohol saturated with hydrochloric acid, the silica is dissolved, and a transparent mobile liquid is obtained. The author supposes that this is a consequence of the silica absorbing the elements of alcohol, which in that case replaces water of crystallization.

Wurtz thinks that silica, like the other acids, may be etherified under the influence of a mixture of alcohol and hydrochloric acids "

It also gives the following method of platinizing glass and porcelain: "Every one who has experimented with an extemporized Marsh's apparatus has found that after the gas has burned a short time the glass tube has become fused and the aperture closed. Herr Dullo says this may be prevented by platinizing the extremity of the tube. He draws out the tube, files it to make it a little rough, and then dips it into a strongish solution of bichloride of platinum, so as to take up a drop or so. He then carefully heats the point until it acquires a beautiful metallic lustre. By repeating this four or five times a good coating of platinum is obtained both outside and inside. In the same way the author platinizes porcelain crucibles, using of course unglazed ones for the purpose."

It also mentions an improvement by R. Mushet, "in producing a superior quality of cast steel, by melting malleable iron together with carbonaceous matter and ores, or oxides of titanium or titaniferous iron ores, or titanic acid, or deoxidized titaniferous iron ores."

It is stated by the *Franklin Inst. Jour.* upon the authority of the *Cosmos*, that "by incorporating into melted steel from 2 to 5 per cent. of Tungsten, there is obtained a steel which is very dense, hard, and strong; admirably fitted for the manufacture of tools. The instruments made with this Tungsten steel are said to keep their temper four times as long as usual."

The *N. Y. Med. Press* says, that to render chlorine gas innocuous, "Prof. Bolley recommends a solution of *anilin* in water, a few drops of which on a handkerchief, and at times applied to the nostrils, will enable a workman to tolerate the action of the chlorine upon the lungs."

BIBLIOGRAPHICAL.

Epitome of Braithwaite's Retrospect of Practical Medicine and Surgery. By Walter S. Wells, M.D., New York. Two more numbers of this valuable work have just come to hand. They would have completed the series according to the original plan, but as it has been found difficult, we presume, to condense all that is desirable into five parts, it has been extended to six. Numbers four and five include all subjects from Hys. to Syp., commencing with hysteria and ending with syphilis. We cheerfully recommend this work to our readers, believing it will yield a rich return for the small sum expended in its purchase.

The Scientific American. This is one of the most useful papers published in this country, and should be liberally encouraged. It is "devoted to popular science, new inventions, and the whole range of mechanic and manufacturing arts," and supplies much important information for all classes of society. Each number contains "sixteen pages of letter-press, and from ten to twelve original engravings of new inventions, consisting of the most improved tools, engines, mills, agricultural machines and household utensils, making fifty-two numbers in a year, comprising 832 pages, and over 500 original engravings, printed on heavy, fine paper, in a form expressly for binding." It is issued every Saturday, by Munn & Co., 37 Park Row, New York, at $2.00 per annum in advance. A favorable opportunity is now presented for subscribing, as a new volume will commence on the first of July. Specimen numbers will be sent free, on application to the publishers.

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ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Extracting Teeth.—In the course of our remarks from time to time, we have expressed surprise that there should be so much difference of opinion about the various modes of practice in a demonstrative science like ours; nevertheless, we feel it a duty to continue to write and communicate what we consider successful practice, even if it be objected to by those whose opinions we respect. Strange, that when we advocate the practice of lancing gums, to lessen pain and render the operation of extracting teeth more certain, we should be charged with inducing unnecessary suffering—the very thing which it is our aim to avoid! We have said, also, that we do not attempt to extract a tooth until *it is ready.* Now, except in some cases, from a neglect to lance the gums well and properly, or waiting until a tooth is in a proper condition to be extracted, a vast amount of pain is induced, and unsuccessful cases met with. If such cases do not occur to writers against the practice, they do most certainly happen to those less skilled in the art. If this be true, we advise the latter to adopt the more certain and successful method. We do not extract many teeth proportionately to our practice, because a great many patients are aware how much we are pressed for time, and do not wish to take the risk of being kept waiting, and therefore go to those whose time is not so much occupied. Besides, a number yet take ether or chloroform, or employ the galvanic battery, neither of which we use, and all that helps to reduce our opportunities of extracting teeth. We never have, nor is it our intention, to set up an argument against any one's practice; we write more to expose our own for the benefit of learners in our art, believing there are many in it, like ourselves, needing all the hints and instruction they can obtain from every source.

It will not be out of place to give a few cases which have occurred to us; nor are they few and far between. They show that the extraction of teeth is not as well understood as it should be, or such cases would not occur except among the inexperienced. Lancing the gums, in a great many cases, does not entail in the aggregate as much suffering as the failure of a single case without it. If a tooth be attempted to be extracted when the pulp is inflamed, or aching from inflammation of the external membranes, the subsequent suffering is much augmented by the injuries inflicted during the attempt at extraction. After due consideration, if the case does not present a favorable prospect of a successful termination, it is the duty of the dentist to endeavor to palliate the pain as much as in his power lies until the extraction is more certain and less painful. We do not hold it to be *modern dentistry*, except in rare cases, which the operator's better judgment will decide, to rush in *pell-mell* to cut, pry, gouge, and pull at a tooth, amid the shrieks and screams of an excited patient, as if he were catching a wild animal, simply because the subject might suffer an ordinary amount of prolonged pain. An educated surgeon does not operate until his diagnosis is favorable, no matter how much his patient suffers.

Case I.—A young gentleman, twenty years of age, was brought to us about six months since, from a neighboring town, with the right inferior first molar broken down to the gum. He was a very powerful young man, of the sanguine bilious temperament, bones hard and heavy. His gums were much bruised by the fulcrum of the key instrument. He was suffering great pain. We lanced the gums well, so that the flaps would yield to let the beaks of the forceps down. His teeth were not far out of the gums; their crowns were short, and the roots long. We also forced away as much of the margin of the socket as we could, placed the forceps on, and removed the tooth without difficulty. Now, if such a case had presented itself to us, we would have prepared it in this way before attempting to extract the tooth. This was the same day, and only about three hours after the unsuccessful attempt at extraction by his dentist. The difference of the failure and success here was solely due to the preparation of the case.

Case II.—A young lady of similar temperament and age as the case described above was sent to us by a surgeon, to get the right inferior second bicuspid extracted, on account of a fistulous opening under the base of the jaw. We lanced the gum in the usual way, and broke off the tooth in attempting to extract it; but it was not very strong. What was to be done? The bone was too hard to be cut away with a lancet, and yet it was necessary that the tooth should be removed. We first placed some nitrate of silver on the root, securing it there with cotton and a piece of cork between the adjoining teeth. This had the effect of destroying the gum to some extent, but the process was too slow. We next placed on the root arsenical paste, and secured it as described above. Of course it spread over the root into the gums, caused inflammation, absorption, and some sloughing. We repeated this once a week for four or five weeks, letting the inflammation subside between each application. The margin of the alveolus became denuded of the gum. We cut it away without pain, obtained a good hold of the root, and extracted it, apparently without pain.

When a fistulous opening exists outside of the face, the root of a tooth seems to be bound down in the socket more firmly than when the opening is in the gum; but the application to the parts of the paste loosens it up by inflaming and thickening the membranes, and detaches the root from its close and firm adaptation to the walls of the socket; hence the operation of extraction is much facilitated.

CASE III.—A gentleman, aged forty-five, who was sent to us from a neighboring city, had the right inferior first molar broken off. The anterior root was extracted by his dentist. The parts had been much injured by the operation. The tissues were irritable, very painful, and somewhat fungoid. The remaining root was very firm in its socket, the parts sensitive to the touch. We placed a piece of cotton in the wound, as the margins of the gums folded in, imbued it slightly with the arsenical paste, and told the patient to call in one week, which he did. We found that the sensitive and fungoid parts had sloughed away; there had been no pain since the paste was applied, and the root was found to have sprung from the socket. We reached down with a small but strong excavator, and removed the root without difficulty or pain. The patient remarked that such a case would injure the local reputation of the dentist.

CASE IV.—A child, aged nine years, was sent to us by a medical friend, with fistulous opening under the left jaw from the first inferior molar. It had been broken off even with the gum one year since, in attempting to extract it. The poor child cried, and exclaimed, "Don't put that sharp thing down my tooth." The mother explained to us that the dentist had hurt the child very much in attempting to extract the tooth, and the more the child screamed the more he persisted in attempting to extract it, so that it had caused her to weep if the name of dentist was mentioned; hence she called on her doctor. We found the roots quite firm and even with the gum, and no prospect of cutting it down to get hold, as the child was so very nervous and frightened from her former suffering. We secured a small portion of cotton between the free margin of the gum and the tooth, saturated with the paste, which in one day loosened the gum somewhat. We renewed the application every few days for about three weeks, until a considerable pledget of cotton could be retained between the roots and the gum on either side; this gave us sufficient room to place upon the roots the beaks of the forceps without lancing the gums, and the tooth was removed apparently without the slightest pain. The roots were not large, and not fully formed. Had this tooth been lanced well, it could have been extracted at first, as the roots were not large or strong. The breaking must have been the result of ignorance and inefficiency. Sometimes we make the slightest incision with a sharp lancet on either side of a root or tooth, and insert in it the arsenical paste or caustic, and in that way obtain space by degrees to hold more, as the case requires. This mode of practice may be new to some operators, and may be objected to because arsenic is *poison*. Whether it be or not, we hope we will not be condemned for succeeding in alleviating human suffering; nor will our preference for it prevent us from adopting a better way if it be suggested by any one in our profession. We ask for nothing but the shortest road to success, inflicting the least amount of pain, and rendering our practice effective and as free as possible from the appearance of *barbarity*.

ARTIFICIAL DENTURES.

BY H. MEREDITH WHITE, M.D.

The plates of artificial dentures should not encroach upon the insertions or origins of the various muscles that are attached to either jaw, or are near enough to the alveolar processes to be liable to injury. Especially is this of importance when the plate is intended to occupy the whole of either jaw, as is the case in full sets.

A plate should not compress any of the ducts of the salivary glands.

All plates should be smoothly burnished, and press equably upon the parts they are destined to occupy. There are exceptions to the latter.

The edges of plates and bands should be rounded, so as to present an appearance like the side of a wire, and well burnished.

The sharp or rough edges of teeth ought to be whetted down and rendered smooth, to avoid injuring the tongue and cheeks.

It appears to me that there is not sufficient attention given to these points in making artificial dentures. If they were more attended to, there would be a saving of much inconvenience to both patient and practitioner. A dentist is often annoyed by a patient's dropping in every few days to get a little of the plate filed off, a little rough place burnished, or a sharp edge of an artificial tooth whetted down. Now the pain of the patient and annoyance to the dentist might be greatly reduced by the exercise of care in the beginning.

It is seldom possible for a plate to be in such a condition, when first introduced into the mouth, as to require no attention afterward; but that condition can be approached so as to occasion but little trouble in future.

It will be better, however, to consider a few of the prominent points somewhat in detail.

1st. The mucous membrane of the cheeks is continuous with that of the gums, and at their junction they seem to be less dense in structure than anywhere else, resting on a bed, so to speak, of loose areolar tissue and fat, and thrown into plicæ or folds, apparently to prevent rupture and undue distention; these appearances are present in both jaws. When a plate has been allowed to run down too far, some of these folds are cut across by the friction and pressure, causing very painful sores, and, if the irritation continues, are apt to degenerate into a low form of ulceration, which is difficult to subdue.

2d. The masseter muscle, on account of its origin and insertion, is liable to be interfered with. The insertion of this muscle sometimes extends far forward on the side of the lower jaw. In all cases, however, the plate should be retrenched at those points, and never allowed to interfere. I have seen a case in which a number of its fibres were cut across by a plate, terminating in a very painful and troublesome ulcer.

It is likewise necessary to keep the edge of the plate off the origins of the following muscles, viz.: the levator of the lower lip, the depressors of the angles of the mouth, the depressor of the upper lip, and also from those parts of the origin of the buccinator muscle near the alveolar process of the superior maxillary bone, and also from its origin on the lower jaw, which is on the "external oblique line of the inferior maxillary, as far forward as the second bicuspid tooth," (*Wilson's Anat.*)

The plate on the inside of the lower jaw should never run down far enough to come in contact with the muscles of the floor of the mouth.

3d. There should be no pressure on the ducts of Wharton, or on any of the numerous ducts of the sublingual glands. There is a case reported some time back, in which the dentist had considerable difficulty because the plate was allowed to compress some of these ducts, causing a temporary ranula, and giving much alarm to both patient and dentist.

4th. A plate should never be allowed to rest upon the frænum of the tongue, nor that of the upper or lower lip, since bruising or cutting them gives rise to painful ulcers.

5th. I have stated above that plates should press equably upon the parts they are destined to occupy; the following are some of the exceptions:—

If there are any painful prominences on the alveolar ridge, the corresponding prominences on the plaster cast should be built up a little with wax, so that when the metallic die is taken the plate may be struck up in such a manner as not to allow it to rest heavily on those parts when in the mouth and in "active service." In extracting teeth to make room for artificial dentures, if there is much unevenness of the alveolus, it is better to retrench the prominences with a heavy lancet or a small pair of bone nippers. It will save nature much time in getting rid of them, and the patient will suffer less discomfort in future. If, however, this was neglected when the teeth were extracted, there are two ways of procedure—they may be cut down upon and removed, or the corresponding points on the cast built up.

Behind the two superior central incisors there is a large papilla, which is directly over the foramen incisivum, through which pass blood-vessels and the branches of a nerve. Upon this a plate should never be allowed to press; it may give pain in a short time, but sooner or later it will cause such discomfort as to almost preclude the use of the plate.

The free edge of the plate outside of the alveolus of the upper jaw, and also of the lower jaw, should never fit accurately; if it does, the parts will be continually fretted, and render the use of the plate painful to the patient.

The plaster cast, at those parts mentioned, should always be built up smoothly with wax, about the thickness of card paper; there will then be comparatively little danger of irritation.

If the sockets of the teeth are not properly filled up, the depressions on the cast should be filled with wax, so as to make the under surface of the plate as uniform as possible, in order not to perpetuate the irregularities of the alveolar ridge.

PHILADELPHIA, July, 1861.

OXY-CHLORIDE OF ZINC FOR FILLING TEETH.

BY J. T. METCALF.

SOME eight or nine years ago, I read in the New York *Scientific American* a short paragraph copied from a foreign journal, to the effect that oxide of zinc became hard like stone on being mixed with a solution of chloride of zinc, and that the compound would be useful in filling teeth. The experiment was soon tried, and the result seemed at first promising; but my hopes were dashed by discovering that although not changed by pure water, the substance was rapidly decomposed by water slightly acidulated. This fact caused the abandonment of further experiments until 1859, when the large claims made for this material under various names again drew my attention to the subject. At that time, with the view of determining the proportions in which the materials should be combined to afford the best results, I instituted a series of experiments in the laboratory as well as at the operating chair, using various preparations, and speedily became convinced of the difference as to durability in the many sorts offered for sale. Of these, I do not propose to speak, but simply to give a method of preparing oxide of zinc so as to produce a dense filling, quick setting, and of fine texture.

But first I would consider the question of its applicability, as well as point to some cases in which it can always be better employed than any other known material. To do this fairly, it is necessary to bear in mind certain manifest imperfections inherent in the nature of the materials, and which it will be difficult perfectly to obviate.

1. *In most cases, if not in all, when exposed to the action of the fluids of the mouth, it is slowly dissolved.*—The necessary inference

consequently is, that it cannot be relied on for a permanent filling. Some fillings put in two years ago remain at this time as good as ever, while others with the same material and under apparently as favorable circumstances were washed out in half that period. Some on the grinding surfaces of molars, subject to the friction of mastication, remain perfect, while approximal and buccal cavities fail, and *vice versa*. This is the experience of all the dentists with whom I have conversed on the subject; and though it detracts from the usefulness of the filling, does not destroy it. "Half a loaf is better than no bread." Far better save a tooth for two or ten years than lose it without an effort. I know there are some who hold that a tooth which cannot be filled with gold had better be extracted at once. With much respect for the opinions of some of these gentlemen, I should differ from them. There are others for whom I have less respect, who will not use the filling under consideration because possibly it might compromise their reputations. But all who hold the interests and comfort of their patients as paramount, and seek with conscientious diligence such means and appliances as will contribute to these ends, will hail with good will whatever promises to be even of temporary utility.

But there are teeth in which oxy-chloride of zinc may be used with *permanent* advantage, and in which its peculiar qualities will commend it to all. I refer to those cases, generally molars, where the enamel remains, for the most part, sound, while the bone under it is extensively decomposed; the cavity running up into the cusps and having but little more sound dentine than enough to cover the nerve pulp. It is exceedingly difficult, if not impossible, to fill such a tooth with gold and make even a decently solid plug without cracking or splitting the enamel. The usual course is to break down the edge of the enamel, until it is found sufficiently strong to bear the pressure; the interior being freely exposed and accessible. This is undoubtedly the proper course when the tooth remains strong enough to admit of it. But in not a few cases the whole of the crown breaks away under such treatment, and the tooth is pronounced "too far gone" to fill.

With the help of oxy-chloride all these difficulties vanish. In such cases it is only necessary to make the external opening large enough to excavate all the decayed bone, making the edge clean and without sharp angles. Then, having protected the nerve with gutta-percha, or by evaporating collodion in the bottom of the cavity, or such other substance as may be found to answer as well, fill to the surface with oxy-chloride. When sufficiently hard, excavate to the edge of the enamel a suitable cavity with parallel sides for a gold plug, taking care to leave no particle above the edge of the cavity. This may be filled with gold and perfectly consolidated without the slightest risk. The oxy-chloride is thus protected from the action of the saliva, while it sustains and strengthens the tooth, making a permanent and beautiful operation.

Some fears have been expressed lest the caustic nature of the chloride of zinc might affect injuriously the bone of the tooth with which it comes in contact. I have examined many fillings with a view of determining this point, and have yet to find the first case where any perceptible deterioration of the bone could be justly attributed to the action of the filling. Where the filling remains sound, the bone will be found sound also.

2. *Contact of moist oxy-chloride with sensitive dentine causes pain more or less severe.*—By far the greater number of cases in which it is unquestionably useful, are dead teeth. The roots having been filled with gold, oxy-chloride is used to build up the crown and supply the lost bone. But cases not unfrequently present themselves like the following:—

A young lady called to have two lateral incisors filled. Approximal and posterior cavities had united to destroy a large part of the teeth, but leaving the front plates of enamel, including the cutting edges and sides, perfect, but so thin as to show distinctly the color of any substance under it. The nerve was not exposed, but the dentine over it exceedingly sensitive. After cutting away the thin edge and removing the decomposed bone, the shape of the cavity was such as to render a gold filling quite out of the question. The mere attempt would have split the tooth across. Obviously nothing could answer so well here as oxy-chloride of zinc. Its color, when seen through the enamel, was made to match the adjoining teeth, and its perfect adaptation and strong adhesion admirably fitted it for the case. The only drawback attending this operation was the *pain*, which was very severe during and for three hours after the filling was introduced. With the opposite lateral, which was in a similar condition, a drop of collodion evaporated over the nerve had the effect of mitigating the pain produced by the filling.

After fifteen months, these fillings remain good, but will doubtless have to be renewed some time hence. By using a solution of gutta-percha, collodion, or some protection of that character over the sensitive dentine, very much, if not all, the pain which sometimes attends the use of this material may be avoided.

3. *While in process of hardening, contact with water retards and arrests its induration.*—This is sometimes a serious obstacle in the way of a satisfactory operation, and occurs most frequently where the cavity runs down to or below the gum. Every care should be taken to keep the filling dry, by napkins, bibulous paper, wooden wedges, ligatures, or such means as may be applicable to the case, until the material hardens sufficiently to be but little injured by getting wet. I have made specimens which were hard enough to scratch marble five hours after being mixed; but if put into water ten minutes after being mixed, it will never acquire that density. By using a material which hardens quickly, good results may generally be reached.

I have instanced but a few circumstances under which I consider this filling peculiarly applicable; but from these it may readily be inferred what range it should take in careful practice. Wherever a good gold or tin filling may be used, plastic materials should be dispensed with, except, perhaps, where the speedy destruction of the tooth is anticipated from other causes.

Method of preparing oxide of zinc.—Triturate thoroughly in a mortar, refined borax, 1 part, by weight; quartz, 2 parts, and then add gradually 45 parts pure French zinc, white. When perfectly incorporated, calcine in a Hessian crucible, at a good red heat, for eight or ten minutes. This forms a *frit*, which, when cool, must be ground very fine, in small quantities, at once, together with trifling portions of coloring matter, such as yellow ochre and burnt umber, to impart the desired shade. To one part of the pulverized frit, add three parts, by weight, of calcined zinc, and combine thoroughly in a mortar. The powder is now ready for use, and should be bottled and stopped tight. That which is recently made, sets quicker and becomes harder than the old; consequently it is better to calcine but a small quantity at once.

The *solution* is made by dissolving one ounce of the dry salt chloride of zinc in six drachms of water. If made weaker, the paste requires a longer time to set, and is not so hard; if stronger, it attracts moisture from the air on exposure, proving that a part of the chloride remains uncombined. Sometimes borax has been dissolved in the solution, but without improving it.

A cheap imitation of one of the expensive and popular brands extensively in use may be made by mixing one part powdered junk bottle with three of zinc, and dissolving some borax in a solution of chloride of zinc. Oxides of lead and tin, which are also used to some extent, are by no means safe agents to put in the mouth, and should never be employed.

New Haven, July, 1861.

REVIEW OF WHO ARE DENTISTS.

BY J. ALLEN.

In all branches of science or art, facts should be chronicled and error discarded. With this view we deem it proper to notice some of the errors in a series of articles recently published in the *Dental Register of the West*, and republished in other dental journals, under the head of "Who are Dentists?" by Dr. Wm. A. Pease. He tells us that

"Dentistry, as a profession, is of American origin. It had its rise in a great public want which nowhere but in the United States existed, and there is little likelihood that it ever will exist in any other country."

The idea here conveyed is, that teeth do not decay except in America. This is an egregious error. But he adds:—

"The want that gave it birth gave it also a vigorous growth, unexampled in any other profession—for *dentistry* cannot truly be said to date back much earlier than 1840. The Baltimore College had just been established, and it was thought that, by scientific investigation, means would soon be found to preserve the natural teeth, and thus greatly diminish, if not entirely dispense with the necessity of artificial substitutes."

Now if the doctor will look at the history of dentistry he will be able to trace it back more than 400 B.C. Hippocrates and Herodotus were among the Greek writers upon this subject; and from among the Romans we have also the writings of Pliny, Martial, Horace, Celsus, and others, which reflect much light upon this subject. And although as a science it was then in a rude state, yet Herodotus informs us that dentistry was practiced in Egypt as a distinct branch of surgery at that time; and corroborating evidences now exist in the fact that good gold fillings have been recently found in the teeth of mummies, which must have been inserted more than two thousand years ago.

Hippocrates informs us that the loss of the natural teeth was supplied with those of artificial, made of bone or ivory, and also human teeth, secured in the mouth by means of ligatures made of flax, silk, gold, or silver wire, attached to other remaining teeth in the mouth. About one hundred and fifty years after Christ, Galen wrote a much better work upon this subject than any of his predecessors, yet very little advancement had been made during the previous five hundred years. During the next fourteen hundred years, various authors wrote upon this subject, among whom were Ætius, Phaxes, Albucasis, Eustachius, and others. In 1579, Pakie, a celebrated French surgeon, wrote a very correct treatise upon the teeth. He enjoyed a great reputation, and was appointed surgeon in ordinary to Henry II., which office he held under three succeeding kings. French and English dentists had acquired celebrity in their native countries long before the Americans could claim supremacy in this branch of surgery, and we are much indebted to them for the light they have reflected upon our pathway in this department of science. From the writings of Eustachius, Hunter, Blake, Fox, Bell, Keocker, Leforgue, Duval, Leroy, and others, we have culled the basis of our profession; and Americans have done much, it is true, to elevate dental science, and a just tribute is now accorded to them by the Europeans, as well as those of our own country, for it. But to say that dentistry *originated* here in the United States, is a false assumption that should not be handed down to posterity in our dental records of the present era. No; the practice of dentistry was first introduced in the United States by Lemair, of the French forces, which joined our army during the revolutionary war in 1778, after which he resumed his practice in this country. Mr. John Greenwood was the first American dentist and he established himself in the City of New York more than forty years ago.

But Dr. Pease tells us that, soon after the establishment of the Baltimore College, "there followed an active course of experiments and investigations, to determine how far plugs would protect the teeth from further decay. Many of these experiments were necessarily imperfect and ill directed; and it soon became obvious that people had more confidence in mechanical than *conservative* dentistry, and neglected their teeth. This neglect was ruinous. At last, in 1854, (it is well to be particular about dates,) a rational theory was promulgated for preventing ulceration and curing ulcerated teeth, and about the same time, as if to fix and make that the initial point for the *advent of dentistry as a profession*, several improvements were made in preparing gold for dental purposes, that enabled dentists to make much more dense and durable fillings, and also to build up and restore the form of broken teeth. *The dental profession was then fairly established.*" "In theory, at least, there was no longer any or but little need of *mechanics* or manufacturers of artificial sets of teeth."

Well might the dental profession then exclaim, "Eureka, Eureka!" The darkness which had so long obscured dentistry at last broke away, and the sun of dental science then dawned upon this our happy land, where it nowhere else could shine. This great effulgence of light has revealed the principles by which a tooth can be plugged and an ulcer cured. Dentistry is now fairly established, says the doctor, and this is the sum total of what constitutes a dentist according to his definition. He seems to have waked up and fully appreciates the importance of these great principles, compared with which the mechanic (as he calls him who inserts artificial dentures) sinks into insignificance, and his vocation is gone forever; for Dr. Pease says: "Now, after more than six years' practice of the new method of treating diseased teeth, dentists feel warranted in saying to their patients there is no necessity for losing your teeth." Again, he says: "Teeth can be so thoroughly plugged that it will be as difficult to remove the plug, as it would be to cut away a corresponding portion of the tooth. Even in those complicated cases where the tooth aches, where there is a swelling of the face, a gum-boil, or a discharge of pus, the pain can still be quieted and the ulcer healed."

No constitutional diathesis or difference in cases are referred to as presenting any exceptions in this new mode of practice, but the reader is left to infer that it is infalible in *all* cases, and yet he tells us on page 282, *Dental Register*, "Never warrant your operations for a day; make your plugs *stick*, but do not warrant them to do so."

If this announcement had been made to the world one hundred years ago, and teeth could then have been preserved as the doctor says they now can be, the following law against obtaining husbands under false pretenses, passed by the English Parliament in 1770, would have been unnecessary, so far as the teeth are concerned.

This law reads thus: "That all women of whatever age, rank, profession or degree—whether virgins, maids, or widows—who shall, after this act, impose upon, seduce, and betray into matrimony any of his majesty's male subjects, by virtue of scents, paints, cosmetic washes, artificial teeth, false hair, Spanish wool, iron stays or bolstered hips, shall incur the penalty of the law now in force against witchcraft and like misdemeanors, and the marriage under such circumstances, upon conviction of the offending party, shall be null and void." But this is digressing.

Dr. Pease says "there are two classes of dentists, or rather, there are dentists and mechanics, from whom very different treatment may be expected. The one, basing their practice on a knowledge of the human system and the laws that govern it, will preserve the natural teeth; they will refuse to extract them, merely because they ache, or there is a gum-boil at the roots." And he further adds, "the patients of the first preserve their teeth."

Then why do they ache and have gum-boils? The skillful physician and surgeon also base their practice upon their knowledge of the human system, but they do not always preserve life and limb. No! it is their knowledge of the human system and of the laws that govern it, that forbids their making such unqualified assertions. It is the empirical who *say* they can always cure the sick, lame, and blind, under all circumstances.

The patrons of the other class, says the doctor, "get a shining set of white teeth, which every one knows to be artificial, in return for which they are but imperfectly cherished; the breath becomes offensive, the mouth falls in, the nose sticks further out, the lips shorten, the lips and cheeks become wrinkled and shriveled, the cheek bones assume an unnatural prominence, and they look prematurely old. The one, feeling little more responsibility resting upon them than what is common to mechanics, act accordingly; they persistently seek for a sale of their wares, talk loudly, and promise much; they obtrusively thrust forward their mechanical contrivances, and press pieces of artificial teeth on the attention of the public,—all of which the other as studiously avoids. The one never rises above the customs of a craft or trade; the other is governed by the rules of a profession."

Now although there may be some to whom the above remarks might be applied with truth, yet to speak thus disparagingly of all who construct artificial dentures (and he makes no exceptions) evinces one of two things—either that the position he occupies in the profession is unfavorable to command a full view of it, or his zeal to eulogize one branch of dentistry at the expense of another has warped his better judgment.

If the doctor will change his stand-point to one a little more elevated, he will be able to see some dentists at least (in the distance if not in his vicinity) who not only plug teeth and cure ulcers, but also insert artificial teeth, which, in point of appearance, are true to nature, and perform all the functions for which they were designed, as well as contributing largely to the comfort and gratification of their patients. But the graphic description of artificial teeth given by Dr. Pease, as above, is evidently from his own practical knowledge of what they are, how they are made, and the final result. When we review his three main points: First, that dentistry as a profession originated in this country, and that "it had its rise in a great public want which nowhere but in the United States existed, and there is little likelihood that it ever will exist in any other country;" second, that the province or legitimate sphere of dentists is limited to plugging teeth and curing ulcers at the roots; and, third, that those who insert artificial teeth are mere mechanics, nothing more,—we are at a loss to define the stand-point from which he views the subject, and the more so, because we have known the doctor for several years, and believe him to be truthful and writes what he conceives to be correct, and although we differ with him on the above points, still he has our respect and esteem.

NEW YORK, July, 1861.

(To be continued.)

ALVEOLAR ABSCESS.

BY W. H. ATKINSON, M.D.

ABSCESS—from the Latin *ab* and *cedo*, to go from; hence separation of tissue between which *pus* is interposed. This may be in various stages of formation, progression, or regression, which constitute the *stages* and *degrees* of the abscess, which so much complicate and render it difficult of diagnosis.

Abscess may be either acute or chronic, idiopathic or symptomatic.

The *acute* form obtains in vigorous systems; the *chronic* in the lax tissues of systems usually denominated scrofulous.

These varieties have many degrees, the dividing line of which is not well defined at first view.

Idiopathic, display themselves at the seat of localized inflammation.

Symptomatic, at a foreign place, and are the result of what is termed metastasis of the inflammation upon which they depend. And as abscess cannot exist without this process, it is well to understand the doctrines pertaining thereto, which, however, are too important and extensive to be entered into in this place, further than to state that density of structures very materially modify the inflammatory process, as to intensity and rapidity.

Alveolar abscess, then, will be the occurrence of the above described conditions in or on the alveolus.

Much confusion and ambiguity in writing and speaking is very apparent when this subject is under discussion, mainly arising from a want of proper nomenclature, some of the confused ones say; in consequence of which let us examine the premises, and see whether looseness pertains to the nomenclature, or the carelessness and ignorance of speakers and writers. So far as correctness of definition, or useful instruction to be derived therefrom, is involved, Harris had better have left the word without definition. It is evident, upon the reading of it, that no distinction is made between abscess arising in soft parts, or within the duplicatures of denser tissues—periosteum and bone; hence gum-boils and alveolar abscesses are synonyms with him.

Now, if this acknowledged head and leader in the doctrines and practices of our specialty is so hopelessly ignorant of a subject of so much importance to the well-being of our patients as to assert that "the only treatment that can be successful is preventive rather than curative, extraction being the lone example of the latter," what marvel if the masses deny the curableness of alveolar abscess! The rule is to deny it, and some have testified on the witness-stand that it was hopeless when once really present, and, a-la-Harris, at once swept all treatment other than extraction from their field of practice, and tried to frown down the efforts of others whose success have finally converted them, and made them desirous of being regarded as "in" on the side of *curability;* and would now gladly hide from their former ignorance displayed when testifying upon a subject they were supposed to understand, which experience proves they as yet knew nothing about. Alveolar abscess has often arisen, progressed, been arrested, and dispersed without ever having been suspected by the patient or practitioner; sometimes leaving a blackened tooth, as a sure testimony that it had been there—a dissection of which will prove it to the most obtuse, as has often been seen when looking for other items.

True alveolar abscesses and gum-boil may exist, separate or combined; and that they may be recognized, all that is necessary is close, intelligent scrutiny.

Gum-boil involves soft tissues only, and does not penetrate the periosteum, nor, alone, cause the death of the pulp.

Alveolar abscess always arises beneath periosteum, and hence has three localities, from which it may arise in the alveolus of every tooth, viz.: 1, from the external periosteum of the alveolar plate; 2, the internal periosteum of this plate, constituting the socket or alveolus proper; and, 3, the peridental membrane, or periosteum of the tooth proper. The first and second instances seldom compromise the life of the pulp, the third very generally has the effect to cause its death; though there are not wanting instances of its occurrence without producing death of the pulp. Gum-boil, therefore, is but a simple superficial phlegmon, and is not even remotely dangerous; while alveolar abscess is always deep seated, generally painful, and destructive in tendency to pulp, process, and tooth; and in bad constitutions is, at times, the inception of malignant disease.

Then to the question, 1. Does it exist? I unhesitatingly answer yes; in all degrees and in all stages, from the slightest separation of tissues to the most complicated, voluminous and distressing forms—fully to point out and explain which would consume too much time, and fill many volumes of close and tersely written matter. For to understand this involves the necessity of understanding the whole range of fact and phenomenon in anatomy, physiology, and pathology.

2. Can it be cured? Ans. Yes.

3. Has it been cured? Ans. Yes.

4. When may we abandon the hope of cure? Ans. When occurring in broken-down and "*blas*" constitutions.

5. After once having been cured, what are the liabilities to recurrence? Ans. The same as the liabilities to original formation.

6. How far gone in periosteal disease must a case be before it is hopeless? Ans. In good constitutions almost any degree of disease, short of entire suppuration throughout the extent of periosteal connections, may be resisted. In poor constitutions slight degrees result disastrously.

As to recurrence, a *soluble* state of the tissues is the most frequent immediate cause; especially if it take place before perfect calcification of the new deposit has been effected.

This state (solubility) very frequently is a concomitant of pregnancy, and should, therefore, be clearly understood and pointed out, that it may secure *early* attention, a necessary precaution in such cases. Cases so occurring, if neglected, are very liable to require the loss of the tooth to elude a worse calamity, viz., a malignant degeneration of the processes, that is liable to extend to the body of the maxilla, producing great deformity, and occasionally death!

What, then, are the more prominent conditions of the system in which this disease occurs? Ans. A *soluble* state of the system (as already stated) the *great* example of which is pregnancy, and hence the frequency so markedly present in such condition.

The next example of a state of *solubility* of the tissues is deranged chylopoetic system, whose predominating *variety* is what is termed malarial or aguish tendencies. I have not known a single case of alveolar abscess occur outside of the above range of molecular conditions.

Atrophied pulps are a prolific source of abscess in good constitutions. In fact it takes (or requires) a good molecular condition to admit of this form of death of pulps. Where this occurs, and some debilitating set of circumstances establish one of the above states of the system, abscess is of common occurrence.

Many cases of spontaneous cure coming under my observation, solely because the fear on the part of the patient, and a scrupulous delicacy and timidity on my part, in my very early and more ignorant days, deferred extraction (my then only known remedy for such cases) until returning health established bearable conditions, and *saved* the organ for future use, taught me that each pregnancy might cause an eruption of the volcanic trouble to subside again, and be useful till like circumstances, oft repeated, either destroyed the explosive tendency, or the integrity of the tooth itself, the latter occurring most frequently. Physicians have seen more of these cases than dentists by far.

The mode of spontaneous cure is very suggestive as to surgical treatment. Benignant pus and other contents of the sac frequently absorb without involving, to much extent, the cellular tissue. But when contents are malignant, the more promptly and completely they are evacuated the more rapid will be the return to health.

Where cul-de-sacs retain malign contents, extension of a sinuous burrowing character may be expected to complicate the case. Pulp chambers often supply this destructive agent a hiding-place, from which to commence the disintegrative action.

Time required for maturing abscess varies. Progress, arrest, dispersion depend upon constitutional tendencies.

Abscess may occur on a single fang of a multifanged tooth, or on all the fangs at once, and the nerve or nerves (pulp) may or may not be dead. Secondary dentine, in nodular masses, is very often met with in such cases, in the bodies and heavier portions of the pulp, as results of the presence of inflammation attending the abscess, thus proving their vitality.

Is the cessation of the susceptibility to thermal changes attributable to the non-conducting power of the secondary dentine? or does some change take place in the pulp itself, resulting in the tolerance so universal in cases of recovered abscess, and where large metallic fillings have been the source of shock? We must be very careful that we do not interpret absence of pain or shock always to mean tolerance; for many pulps die and absorb, or convert into benign pus, that occupies the chamber for years, sometimes, without giving tangible testimony to a superficial examination of the positive death of the pulp. Such cases are ready to create a disturbance whenever, for any cause, debility or intolerance becomes present, and then, usually, is the time thought to be the incipiency of abscess.

I have now under treatment two molars, right first superior and inferior, that were carefully and well filled by one of our most reputable dentists of that State of princely dentists, New York, that have passed exactly this train of conditions: one, the lower, had formed and ruptured its abscess; the other had only matured the sac around the buccal fangs, and slightly enlarged the region without causing more than a little uneasiness, not amounting to pain.

I have filled both into the fangs after preparatory treatment, and the abscesses are now doing well, discharging effete tissues at fistulous openings established for this purpose, which are dressed now alternate days.

As to treatment, I can now, for want of space, give only a very abridged synopsis of what it ought to be.

Treatment of alveolar abscess naturally divides into abortive, and coincident or accelerating.

Abortive can only be successful in cases where solubility is slightly present, and very local or circumscribed. Two methods of abortive treatment are admissible: 1. Local and constitutional stimulants or sedatives. 2. Surgically freeing the local congestion, confining serous and neural circulation.

Coincident (coinciding) or accelerating treatment may also be local or general constitutional, and consists in assisting nature to fulfill her intents, by hastening and abridging her processes.

Cleveland, July 22, 1861.

EDITORIAL.

OXY-CHLORIDE OF ZINC.

This substance, as a filling for teeth, has attracted the attention of many members of the profession for some time, and, like all new things, has had its advocates and its opponents. To whom the credit belongs of first introducing it to the dental profession we do not know, as we give new things little attention while undergoing their mutations from the experimental to the practical. The mere *venders* of it lauded it so extravagantly that it was repulsive, and those who had used it, in many cases failed, and of course we gave it no attention, and looked upon it as among the fleeting catch-penny materials of the times, until our attention was drawn to it in an honest and candid, but not extravagant manner, by a gentleman of whom we were not before acquainted, about eighteen months since, Dr. J. T. Metcalf, of New Haven, and to whom we are under many obligations. Those who advocated it, claimed too much; and those who condemned it, did so in toto. Strange that in new things one party only directs attention to all that is good, and the other to all which is bad: the right ground can never be occupied in this way. The only candid, able, and fair article which we have yet observed upon the subject, where the merits and demerits are properly exposed, will be found in the present number of this journal, from the pen of Dr. J. T. Metcalf: the manner in which the subject is handled commends itself to every candid mind. The doctor sent us samples of his preparation twice; and, using it as directed, have met with unexpected success; and while we believe with him that where a tooth is strong and firm, gold is still the best, the zinc filling is invaluable in many cases, and, as he remarks, in dead teeth. We observe in the July number of the *Dental News Letter*, that the zinc filling has been used by "A Friend to Progress" some five years since; it was also referred to in the *Dental Register of the West*, June number, 1860; but Dr. Metcalf's experiments date prior to this time. We used the article as prepared by another manufacturer about two years since, but did not meet with the same success as with that furnished us by Dr. Metcalf. We saw a case a few days since; it was a large left superior molar; a dead tooth; it had been plugged with amalgam. Whether the amalgam shrunk from the walls of the cavity or the moisture forcing its way between the plug and the margin of the cavity so as to favor decay, we do not know; but the plug seemed to be too small for the cavity, and the tooth was in a state of decay. We removed the amalgam and filled the tooth with the paste sent us by Dr. Metcalf; the buccal wall of the cavity was so thin and transparent that the plug could be distinctly seen through it. We took this as a good case to observe whether the zinc would decompose the tooth substance or not: up to this time, sixteen months, it is as good as when first introduced. We condemned the zinc filling at first because we saw many cases where it had been used, and unsuccessfully too, in small cavities in front teeth, where there was no excuse for using it; we doubt not that its restricted use will be of great value to the profession. We will give our experience with it as circumstances may dictate, and hope other members of the profession may do the same. J. D. W.

PROFESSIONAL JEALOUSY.

In connection with Dr. Allen's paper on this subject, which is presented in another part of the magazine, we would direct attention to a fact, which no doubt has been noticed by every careful observer, that what the world calls *conversation* is—with some fractional differences, too small to be noticeable—mainly *biographical* or *autobiographical* in its character; in other words, friends and acquaintances, as a general thing, entertain each other with what they have done, are going to do, and can do; or what others have not done, should not do, or cannot do. There is this difference, however, between refined and elevated natures and low and groveling spirits—the first finds pleasure in contemplating the excellencies, and only regrets at the shortcomings of human nature; while the latter apparently gloats over the imperfections of others.

When that eminent orator, dramatist, and wit, Richard Brinsley Sheridan, makes Sir Peter Teazle, in "The School for Scandal," say, in response to the hostess, on leaving a party where the characters of all their absent friends and enemies had been severely commented upon, "Your ladyship must excuse me; I'm called away on particular business; but I leave my character behind me," he gave unmistakable evidence of his knowledge of the common practice of small minds, whose pitiful natures can find no higher occupation than that of traducing those with whom they are brought in contact by the relations of business or pleasure. Looking entirely upon the dark side, magnifying each defect, and suppressing everything that could be said to the advantage of others, such persons appear to be actuated by the desire to drag others down to their own level, find extenuation and countenance for their own faults, or, in the language of Butler,—

"Compound for sins they are inclined to,
By damning those they have no mind to."

The comments of such persons have a wide range, from the character of the individual to everything emanating from or connected with him; and it would be singular if a defect thus common with a portion of the world should not invade, to a certain extent, the profession of dentistry. That such is the case, the communication referred to, and the experience of every practitioner, no doubt will more or less corroborate.

A lengthened and intimate acquaintance with a large number of the profession, who, as a general thing, in commenting upon their fellow-practitioners, have expressed themselves in terms of admiration and respect, or, where they could not say anything to the advantage of another, have refrained from giving utterance to their sentiments, induces us to believe that the disposition to malign their fellows is the exception, rather than the rule, with those who feel a deep interest in the advancement of the dental profession.

Although it will be readily conceded that those who can indulge in such practices are unworthy of notice, yet it is an indisputable fact that very worthy men have frequently allowed themselves to be unnecessarily annoyed by the ungenerous comments, or *reported* comments, of others. And here we would take occasion to say that the majority of the remarks which are carried backward and forward between practitioners by their patients should be received with many grains of allowance; and when one feels that he has been aggrieved by the strictures of another whom he has been accustomed to respect, in place of nursing his trouble in secret, let an explanation be demanded; and in nine cases out of ten, the word unkind, or wrongly taken, which has often severed the most intimate professional relations, will be found very different from what it was when magnified in importance by the tale-bearer.

Admitting, however, that one really has been maligned by the innuendoes, the covert or open attacks of a practitioner, or that a number of them waste their time in the same elevated occupation; what then? Work on, the same as if they were not in existence, and, making no response, allow a life to speak for itself. What folly it would be to elevate such persons in importance by noticing them, engage in a fruitless encounter, exhaustive alike of time, energies, and temper, or allow a feeling of despondence to overcome one to such an extent as to dampen all ardor for improvement and advancement!

So far as the active purposes of life are concerned, there perhaps can be no more deplorable state of mind than that last referred to. Every one, according to temperament, is more or less liable, when things appear to be going wrong, or the system is a little out of order, to moments of despondence. In healthy physical and mental organisms such feelings, however, are only ephemeral in their existence; but some persons are so unfortunately constituted that they succumb without a struggle to difficulties and oppositions which only tend to develop the latent powers and energies of others. They lack that indomitable energy which enables such natures, when difficulties are to be overcome, to labor on while the world rests, and who, undiscouraged by reverses, make more careful preparation for the future.

There can be no question that talents are not always recognized as promptly or as fully as they should be; but no one has a right to say on that account that the world opposes and does not show him a fair chance.

According to individual estimates, there are many thousands—ay, millions—of neglected geniuses; but as they afford the world no tangible proof of the fact, their ipse dixit not being regarded as all-sufficient evidence, the claim is denied, or passed over in silence and neglect.

If the physical or intellectual capacities of men are not equal to the struggle demanded by their aspirations, if their love of ease and pleasure is so great that they allow opportunity after opportunity to pass by unimproved, or if they waste that time in useless repinings and vain regrets which should be devoted to self-culture, physical, moral, and mental, they have no right to blame the world, for the defect is with themselves, and the sooner they adopt the advice of the Delphian oracle, "Know thyself," the better it will be for themselves and others. Truly has it been said that he who conquers himself is greater than he who conquers many cities.

Far from the world opposing, it is ever willing and *eager* to *help those* who *help themselves;* for he who helps himself not only creates a feeling of self-reliance and sets a good example, but also helps the world by the act. He is not a mere consumer, but, in every sense of the word, a producer, and, like every laborer, is worthy of his reward. This he will gain, sooner or later, when his abilities, application, and integrity are justly recognized and appreciated.

To a properly constituted mind there is a genuine and heartfelt pleasure in rendering aid and encouragement to those who are struggling upward against every obstacle; one thus engaged, however, is only making just acknowledgment and compensation for similar services received from others in former days.

It is often, thus, in the power of one dental practitioner to render a tribute of respect to another, or for an old member of the profession to assist a young one, and when the opportunity is afforded, or when one is questioned by a patient with respect to the attainments and capabilities of another, worthy of respect, no petty jealousy or smallness of mind should induce one to damn with faint praise, but in a frank and manly manner give a thorough indorsement of his capacities. Such a course will not detract an inch from one's stature, and he who adopts it will find that he can afford to continue it.

There are cases, however, presented to the notice of the practitioner, in which he is called upon to pronounce judgment upon the failures of others. Let this be done with all justice to the patient and charity to the operator. The truth must be told, for that hurts no one; but in commenting upon failures, it is far better to deal leniently with them. One does not know all the circumstances and influences beyond the control of the operator that may have brought about such results. Again, if he expects any charity to be shown to his own shortcomings, he must extend it to others.

An experience of years, and large opportunities for observation, have taught us that, as a general thing, those who are loudest in denunciation of the failures of others have the greatest need for charity on the part of their compeers, so far as their own operations are concerned.

J. H. M'Q.

THE AMERICAN DENTAL CONVENTION.

It affords us much pleasure to announce that, notwithstanding the national troubles, our enterprising friends of this body will hold their annual convention in New Haven, Conn., on Tuesday, the sixth day of August next, at 10 A.M. We sincerely hope there will be a large attendance and a profitable meeting, and if in our power we intend to be present.

J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

NEW YORK DENTAL JOURNAL—APRIL.

"PROFESSIONAL JEALOUSY. (Paper read by Dr. JOHN ALLEN before the New York Dental Association.)—In order to elevate our profession it is important that each of its members should contribute his due proportion of aid for the accomplishment of that object. This he can do by first qualifying himself for the discharge of his own professional duties, and by co-operating with, and sustaining other members of the profession who are entitled to confidence, not only in all the general movements that are made to raise the standard, but also to sustain his fellow-practitioners in their private practice so far as he can consistently, in an open, frank, and candid manner. Yet some make it a point invariably to disapprove by insinuations, or condemn outright, every operation they may chance to meet with that has been performed by another; whatever merit may attach to a piece of work, if not done by themselves, is entitled to no credit; they will find some fault, some hook to catch upon, by means of which they will endeavor to sink other operators as low as possible in the estimation of their patrons. If an individual has had services rendered by different dentists, he will find that each one (who is afflicted with this mental malady) will condemn in turn all that has been done by his predecessors; the last one consulted will endeavor to impress it upon the mind of his patient that all his former operations have been worthless, and that those who performed them were mere quacks who knew nothing of their business. But, says the patient, they were highly recommended to me, and some of their work has rendered me essential service; here is a tooth I had filled twelve years ago, and there is one that has been filled seven years, and they seem perfectly good yet. Very true, replies the doctor, they *seem* to be good, but you are not aware of the decay that is going on under those fillings; they are not filled as *I* would have filled them; if they had been they would have lasted you forty years. Well, replies the applicant, I do not wish anything done this morning, perhaps I will call again. Thus it will be seen that the doctor's efforts to malign his competitors served only to lower himself in the estimation of his supposed patron, for *he* takes his leave fully impressed with the belief that this wiseacre has missed his mark, for he savors as strongly of quackery, if not more so, than those he attempted to revile. * * *

"With these dead weights upon our profession, dental progress is retarded, and ever will be while a part of its members are trying to build themselves up by putting others down.

"Why should this be?

"Does any one really think that by so doing he will increase his own business or reputation? If so, he is mistaken, for professional jealousy neither benefits *him* who possesses it nor the profession to which he belongs; on the contrary, its withering influence contracts the mind, and often blights the fondest hopes of professional fame.

"It is an old saying, that in union there is strength, and it is no less true than ancient. Let us, therefore, be united in all that pertains to professional excellence, mutually receiving and imparting that which is useful, and gathering gems of thought from each other to place in our own diadems; approving and commending all that is right, and condemning only that which is founded in error."

NEW YORK DENTAL JOURNAL—JULY.

"LANCING GUMS. By ABR. ROBERTSON, D.D.S., M.D., Wheeling, Va.—As I intimated in the last number of the journal, I propose to offer a few observations on lancing the gums preparatory to extracting teeth.

"This, in some cases, is an important preliminary operation; and when required, should be done well and thoroughly.

"The cases which require the operation are the roots of such teeth as are decayed, or broken off so far below the gum and the edge of the alveolus that they cannot be seized or apprehended by the forceps, or other instrument to be used for their removal, without cutting, or otherwise injuring the gums; or such roots of teeth as from inflammation or otherwise have the surrounding gums more or less closed over them, rendering it difficult to apply any instrument, without first removing the gum, or at least not without inflicting a great deal more pain with the extracting instrument than with the knife.

"The manner and the amount of cutting will, of course, depend on the circumstances of the case. If it be a firm root, broken off so low that, to remove it, it is necessary to remove a portion of the alveolus, the gum should be dissected, by one or two strokes of the knife, from the alveolus, as deep as the forceps are to be applied and as wide as is necessary to facilitate their application; another cut should also be made, by a single stroke of the knife, in the direction of the length of the root, forming two small flaps of the dissected gum. The same operation should be performed on both the outer and the inner sides of the root, if the forceps are to be used; but if the case is one where the elevator is best adapted, it will only be necessary to make the cuts on the outside.

"In performing the operation, any of the curious, and even complicated lancets, on which so much exuberant ingenuity and skill have been expended, can, perhaps, with great care, be made to answer the purpose as well, or nearly as well, as a simpler and more convenient one; and a plain bistoury, or a scalpel, or a common penknife will answer just as well. Although, as I have said, this operation is sometimes necessary, and in some cases quite important, yet, as a general rule, it ought to be entirely omitted; and for various reasons. The first of which is, that, in all ordinary cases—and the exceptions are *very* rare—that is to say, in all cases of entire teeth, and most roots of teeth, it is entirely useless.

"The resistance to be overcome in the extraction of most teeth being offered mostly by the strength of the firm, dense membrane which unites their roots to their alveoli, it is, therefore, very evident that simply severing the gum from the neck of the tooth, to which usually it is but slightly attached, and all of it that can be reached by any ordinary gum lancet of but small extent, can have but little influence in lessening the amount of force required to extract them. A knife or gum lancet of any kind cannot, by any possibility, be carried far enough between a tooth and its alveolar process to sever but a very small portion of the periosteum, and it is very seldom that any one ever attempts to cut this membrane below the edge of the alveolus, unless it may be in the case of some loosened root, which he intends to remove entirely with his knife.

"The next great source of resistance, in this operation, and sometimes not unfrequently the source of greatest resistance, is the divergence or the convergence of their roots, or the divergence of them for a portion of their length, and their convergence the balance; requiring, if one or more of the roots do not first break, the removal of the bony septum between their roots, or the yielding of the parietes of the alveolar cells, or the springing of one or more of the roots to admit of their removal, even if the periosteum were all scraped or macerated away.

"Corrugations of the roots, or crooks in them, exert a similar influence, which no knife or lancet, of however ingenious form, can overcome.

"As already remarked, the attachment of the gum to the neck of a tooth is always but slight, and the extent inconsiderable; so slight and so inconsiderable, that no operator or patient could possibly appreciate the difference in the amount of force required, or the pain experienced in the operation, whether the gums were cut or not.

"And besides all this, the lancet is rendered entirely unnecessary in almost all cases, by the fact that properly constructed forceps—forceps thoroughly fitted to each class of teeth to which they are to be applied—will quite as thoroughly remove the gum from the neck of the tooth, and by the same movement that applies them, as any lancet can be made to do it, and with no more pain in the application—with even less pain in the application—than if the gums had been ever so freely lanced.

"The operation of lancing the gums preliminary to extracting a tooth is, in most cases, not only unnecessary, but decidedly objectionable, for many reasons. It produces a great deal of unnecessary pain.

"With many patients the dread of having the gums lanced is greater than that of having the tooth extracted. Many timid and nervous patients can, by great effort, bring themselves to bear the infliction of one pain, but cannot a second. So, it is no uncommon thing for such a one to submit to having the gums lanced, and then to go away without having the tooth extracted, but who would gladly have had it out if it could have been done at once, *as it should have been.*

"There is also some more danger from excessive hæmorrhage when the gums are lanced, than when they are not. A smoothly cut surface is more liable to bleed badly than a lacerated wound. Therefore, especially in all cases when it is necessary to extract a tooth, and a *hæmorrhagic diathesis* is known to exist, or is mistrusted, the use of the lancet should be most sedulously avoided.

"I once knew a child to bleed to death in the hands of a very able surgeon, from simply cutting the child's gums to facilitate the eruption of its upper deciduous central incisors, though all known means were resorted to to arrest the bleeding, from simple and long-continued pressure through all the range of styptics and astringents—from cold water to the actual cautery.

"The only arguments known to me in favor of the general use of the lancet is, that by the adhesion of the gums to the neck of the tooth sometimes the gum may be lacerated before that adhesion yields. If this were the usual result of neglecting to use the lancet, or if it were even a frequent occurrence in consequence of such neglect, there would be force in the argument. But as that accident, in my experience and observation, does not occur more than once in several thousands of operations, and even then is usually the result of other carelessness, the good rule not being observed of operating no faster than the eye can follow, or than the hand can be stayed at any stage of the operation; and as the forceps, as already demonstrated, generally accomplishes the object more effectually, without loss of time to the operator, with less pain and without the interval of terrible suspense to the patient; therefore, on the principle of 'the greatest good to the greatest number,' I cannot think it justifiable to torture the great multitude in order to save an individual, or even a few persons from the possibly slight infliction of pain that might thereby have been avoided.

"Have a gum lancet, then; let it be a good, plain, practicable, instrument, but use it seldom."

A large number of the dental profession, among whom are many for whose opinions we have every respect, regard it as an all-important and essential point to lance the gums prior to extraction. Convictions based upon an experience extending over a considerable period compel us, however, to add our testimony in support of the position assumed by Dr. Robertson; and in doing so, take occasion to say, if there is one writer in particular for whose matter and style of communication we have a decided preference, it is his. Not that we can always agree with his views, but there is a straightforward, decided, and terse way of expressing himself, a manner which seems to indicate that the writer would as soon think of apologizing for the head upon his shoulders, as for having opinions of his own, that it is not only refreshing but encouraging to recognize in him an earnest and efficient laborer in the cause of dental science.

There are numerous cases in which it is highly proper and necessary to employ the gum lancet, prior to applying the forceps in extracting teeth; but to assert, as some do, that it should be used under all circumstances, is, in our opinion, claiming more than is absolutely demanded.

The attachment between the gum and the neck of the tooth, it is true, is sometimes so firm that it is not at all surprising Caldwell should have imagined he had made a great discovery in his so-called dental ligament. In a few cases this attachment has been so firm that *bungling* operators have removed two teeth in the attempt to extract one.

According to our experience it is, by far, the exception and not the rule when such decided attachments exist; when they do, the lancet, of course, should be employed; but, as a general thing, the anatomical relations between the gum and the tooth are such that they can be readily and thoroughly severed by sharp-edged, thin-bladed, properly-constructed forceps, driven rapidly and decidedly as far up the root as practicable. As Dr. R. truly remarks, the strong periosteal attachment between the alveolus and the roots, their divergence and convergence, their exostosed or curved condition are, one and all, by far greater difficulties to overcome, in the extraction of teeth, than the connection with the gum.

With very many patients lancing the gums is the most painful part of the operation, and they frequently refuse to permit anything more to be done; the sight of the blood, in some instances, is sufficient to induce syncope, and its presence in the mouth invariably complicates the operation, making frequent rinsing of the mouth with water absolutely necessary before a fair view of the tooth can be obtained, or the forceps properly applied.

We have said there are instances in which, in our opinion, the lancet should be used. They are as follows: When the very decided attachment, already referred to, exists; when roots are buried in the gum; and invariably prior to extracting wisdom teeth, as there is very great danger, if the attachment between the gum and the posterior part of this tooth is not severed, that the soft palate or the pharynx may be severely lacerated, by the parts being torn away with the tooth.

There is not want of humanity in dispensing with the lancet, as a general thing, but, on the contrary, a proper regard for the comfort and feelings of the patient.

THE DENTAL REVIEW, LONDON—MAY.

"HIPPOPOTAMUS TEETH OR TUSKS. By THOMAS D. ROCK.—One great difficulty—happily not always insurmountable—which invariably attends the path of the technological student, is that which arises from the erroneous application of proper names. Thus, the article now proposed for consideration is treated by different authors under the terms sea-horse teeth, morse teeth, and hippopotamus teeth—the first two names being applied, indiscriminately, both to the walrus and hippopotamus; although I believe that, *commercially*, the term sea-horse is restricted solely to the teeth of the latter animal.

"The word hippopotamus is compounded of two Greek nouns, ἵππος and ποταμὸς, and literally signifies 'the river-horse,' a name bestowed upon this singular animal by the ancients, to whom it was very probably suggested by the amphibious nature of the creature, and the striking resemblance which its profile bears to that of the equine family; more especially when seen just emerging from the surface of the water, with ears erect, the unwieldy body, at the same moment, being hidden from view.

"Visitors to the Regent's Park Gardens, where two hippopotami are to be seen constantly enjoying the pleasures of the bath, may, by careful observation, verify for themselves the appropriateness of the name thus bestowed upon this interesting mammalian.

"The Dutch Boers of South Africa distinguished this animal by the rather curious appellative of 'zee-coe,' or sea-cow.

"Hippopotami form by themselves a distinct genus of the pachydermatous, or thick-skinned animals; and even of this distinct genus there is but one living species—'*Hippopotamus amphibius*'—found exclusively in certain parts of the African continent.*

"The interest attaching to this animal from an economic point of view is rather limited, being confined to a local use of its skin and flesh by the African natives and colonists, and the more general application of its powerful teeth, or tusks, as a substitute for true ivory.

"However interesting it might be to consider the general anatomical and physiological features of this gigantic creature, or to trace out the resemblance thought to exist between it and the 'Behemoth,' described in the Book of Job, I propose to confine my remarks exclusively to its singular dental apparatus, and such other matters as relate immediately thereto.

"The mouth of the hippopotamus is one of the most capacious in the animal world, and is armed with a set of teeth of the most powerful description, adapted solely for cutting and bruising its food, which is of the coarsest and rankest kind, and such as is found lining the banks of the tropical rivers of Central and South Africa.

"The dental formula is as follows:—

$$\text{Incisors} \;.\;.\; \left\{\begin{array}{ll}\text{upper jaw} \;. & 4 \\ & \text{—} \\ \text{lower jaw} \;. & 4\end{array}\right. \qquad \text{Canines} \;.\;.\; \left\{\begin{array}{c}1\text{—}1 \\ \hline 1\text{—}1\end{array}\right.$$

$$\text{Molars} \;.\;.\; \left\{\begin{array}{c}7\text{—}7 \\ \hline 6\text{—}6\end{array}\right. = \text{38 teeth in all.}$$

"The molars evidently play but a secondary part in the economy of this animal, and a portion of them are described as 'strictly false molars;' that is, the three molars of both jaws that succeed the canines, and which are conical in form, having only one point. The posterior molars are armed with two rows of points, which gradually wear down to a trefoil surface. To man, the molars of the hippopotamus are perfectly useless.

"Incisor teeth, as the name imports, are the cutting instruments of the jaw; and of these teeth, which are situated in the fore front of the mouth, the hippopotamus possesses eight: four in the upper jaw, which are short, conical, cylindrical, and curved slightly inward; and four in the lower jaw, cylindrical, straight, pointed and projecting forward, the two centre ones especially, termed lateral incisors, which are both longer and larger than those next the canines. These incisor teeth are of some value in the arts for their ivory.

"It so happens, that the teeth most highly prized by man are those that occupy the most prominent place in the dental economy of the hippopotamus: these are the canines, which may be described as 'enormous tusks,' sharpened at their points, by mutual attrition of those in the upper and lower jaw, into oblique 'chisel-like edges.' They are four in number, two in each jaw; the upper ones being short, slightly curved, rounded on the outer side, deeply furrowed in the centre on the inner side, and ridged longitudinally, more especially on that portion of the tusk which is coated with the enamel. The canines of the lower jaw are considerably larger, are very much curved, like the tusks of a boar, and in shape somewhat elliptical; they are also ridged after the same fashion as those in the upper jaw.

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* Some naturalists distinguish between the hippopotami of South and West Africa, making two species—*H. Capensis* and *H. Senegalensis*—but the difference is so small that this division is for the most part rejected.

"Both the incisors and canines of this animal, although properly called teeth, are virtually tusks; for they are uninterrupted in their growth, are formed on cores, and consequently hollow for a considerable portion of their length.

"The canine teeth or tusks of the hippopotamus are primarily composed of the two substances known as *dentine* and *enamel:* the first named forming the principal body of the tusk, while the enamel is merely an external shield, or tooth armor, of a denser and more durable material, and described as sufficiently hard to strike fire when contused with steel.

"The enamel is not continuous throughout the entire circumference of these tusks, but only to the extent of from one-half to two-thirds of the whole, and occurs on such portions as appear to be the most exposed to injury: lengthwise, the enamel extends from end to end, and is formed anew, in conjunction with the dentine, as the tusk grows. In thickness, the enamel varies from 1-32d to 1·16th part of an inch, according to the size of the tusk. River-horse or hippopotamus teeth contain less organic matter (33·00) than either elephant ivory or the tusk of the walrus, in which substances the organic elements amount to about 44·00 and 38·00 per cent. respectively. The chemical composition of these teeth, as well as the essential difference between their dentine and enamel, is advantageously illustrated in the following analyses by Thomson :—

HIPPOPOTAMUS TEETH.

Constituents.	Enamel.	Dentine.
Organic Matter	4·102	33·41
Phosphate of Lime	83·630	55·90
Fluoride of Calcium	0·850	....
Phosphate of Magnesia	....	1·19
Carbonate of Lime	10·620	9·14
Chloride of Sodium Chloride of Potassium	0·800	0·36
Total	100·002	100·00

Sp gr. of the dentine, 1·866.

"A mere glance at the foregoing table is sufficient to discover the more prominent qualities of the teeth now under consideration. The larger proportion of mineral matter in this dentine, coupled with great density of formation, renders it both harder and less liable to receive stains than other bone substances; while to the smaller amount of organic matter, and the almost entire absence of oily particles, the delicate and superior whiteness of these tusks is to be attributed. It is the combination of these especial qualities, density and whiteness, that makes the hippopotamus teeth so invaluable to the dentist.

"On the other hand, the absence of oily matter, and the comparatively smaller amount of animal substance in this bone, induce brittleness, and cause it to be more easily affected by the acids of the food and saliva.

"The enamel is still harder and whiter than the dentine, by reason of its being composed almost exclusively of phosphate of lime, with only about 4 per cent. of organic matter. Dentists are the principal consumers of the canines of the hippopotamus; for no bony substance has hitherto been found that possesses, to so great an extent, the properties requisite to the successful performance of their art. Mineral teeth are, for the moment, in great favor; but, after all, it is very questionable if any artificial substance can be made so appropriate as the precise material which an infinitely Wise Being has selected, and supplied, both to man and the lower animals, for the purpose of mastication.

"When these tusks are employed for the manufacture of front teeth, the enamel on the surface is valued, and retained, for the sake of its delicate whiteness and density, as before described; and the tusk is so manipulated that this enamel forms the outer or visible surface of the teeth. But when used in the production of artificial gum, or back teeth, (molars,) the enamel is removed by the aid of a chisel and grindstone, or, more frequently, by steeping the tusks or sections thereof in a solution of muriatic acid, sufficiently long to destroy the enamel, without affecting the dentine; the softer parts, at the same time, being coated or painted over with some fatty substance, to preserve them from injury during the operation. Sometimes the blowpipe is resorted to as a means of removing the enamel, and a fine file is afterward used in either case, for imparting the final surface to the bone. The points of the canines are generally defective, and in the process of working are first removed, the tusks being afterward sawn into transverse sections, of varying thickness, according to the destined application, and as required by the operator.

"Although the teeth of the hippopotamus are all but monopolized by dentists, yet the very excellent quality of their dentine is more widely appreciated, and likewise adopted for a few other purposes in the arts. When great delicacy is required, this bone is found more suitable for carvings than the ivory of the elephant, and is much used in France for this purpose, especially in the manufacture of fine brooches.

"The handles of surgical instruments are sometimes formed of this material, for which purpose it is admirably adapted, because of its being less liable to receive stains than other sorts of ivory.

"Vases made of hippopotamus tusks were displayed in the Great Exhibition of 1851; and in the Irish Exhibition, a Mr. R. Barter, of Dublin, exhibited some elegant intaglio brooches, consisting of figures carved in the same substance, and mounted on a groundwork or surface of cornelian. The enduring nature of the hippopotamus ivory appears to have been known and valued as early as the first century; for, according to a writer named Pausanias, a certain Greek statue of 'Dindymene' had its face 'formed of these teeth, instead of elephant ivory.'

"A few words on the incisor teeth of the hippopotamus received into commerce will suffice. They are not so generally imported as the canines, with the exception of the two lower, lateral, and projecting incisors, commonly called tusks in the market, as distinguished from the canines, which are usually termed teeth. These projecting incisor teeth, as already described, are long, straight, and hollow for a portion of their length, like the canines, but differing vastly in quality from the latter, being considerably softer, and more easily affected by the fluids of the mouth, so that they are seldom used by dentists. Yet these long, straight teeth have their especial application, being employed in the manufacture of the long knitting needles and netting meshes used by ladies, as well as for other more general purposes. The enamel on these lateral teeth appears to be confined to the projecting point, and does not extend into the jaw.

"The smaller and curved incisors of the upper jaw are comparatively valueless, except for common turnery work.

"I may here mention, that unless the teeth of the hippopotamus are employed by the dentist, the enamel is always removed, and generally by means of an acid bath, as no ordinary tool produces any effect upon it.

"As the Board of Trade returns furnish no separate account of the imports of hippopotamus teeth, I cannot give any statistical table of the extent of our trade in this article, but should roughly estimate the quantity imported at from 7 to 10 tons annually; which, considering the limited source of supply, is far from being small. The importation of these teeth into Liverpool in the year 1850 was 2½ tons; and as by far the larger quantity received enters the port of London, I think my estimate of the total is not overdrawn. The value of hippopotamus teeth depends both upon size and quality—those being the most esteemed that are large and free from flaws. In years that are past, as much as 30s. per lb. has been paid for fine tusks; but the price may now be said to range from 1s. per lb. to 17s. or 18s. per lb. At a recent sale, some very small teeth realized only 7½d. per lb.; but the following table, compiled from a sale at the end of last year, will perhaps convey to the reader a better idea of the comparative value of these tusks:—

Teeth	averaging each	6 lbs.	realized	17s.	per lb.
"	"	5¼	"	13s.	"
"	"	5⅕	"	8s. 9d.	"
"	"	5	"	11s.	"
"	"	4½	"	11s. 6d.	"
"	"	4⅕	"	14s. 3d.	"
"	"	4	"	10s.	"
"	"	3¾	"	8s. 6d.	"
"	"	3¼	"	6s. 6d.	"
"	"	3	"	3s. 7d.	"
"	"	2¾	"	4s. 9d.	"
"	"	2	"	2s. 2d.	"
"	"	2	"	1s.	"
"	"	1½	"	1s. 1d.	"
"	"	1⅓	"	2s. 4d.	"

"Allowing 20 lbs. on an average for every set of hippopotamus teeth imported, and presuming our total imports are 10 tons, no less a number than eleven hundred of these giant creatures must be slaughtered every year to supply our markets.

"At the present time, the demand for hippopotamus teeth is small, and no scarcity is felt; but as civilization advances in West and South Africa, and the animals become gradually exterminated, it is probable that the time may come when this comparatively insignificant, though useful and valuable article of commerce, will be sought after in vain."

SELECTIONS.

[We are indebted to the courtesy of Harper & Brothers, New York, for permission to publish the following extracts from the highly interesting volume just issued from their press, entitled "*Adventures in Equatorial Africa*," by P. B. Du Chaillu.]

Some have given to the gorilla the honor of approximating nearest to man in structure, while others reserve this for the chimpanzee. Dr. Jeffries Wyman, the accomplished and distinguished comparative anatomist of Harvard University, was the first to give a scientific account of the cranium and of a part of the skeleton of the gorilla in 1847. To him belongs the honor of having first brought to the knowledge of the scientific world this wonderful animal. In 1849, Dr. Wyman gave another description of two additional crania of the gorilla. In these memoirs he classified this animal in the genus *Troglodytes.*

In 1848, Professor Richard Owen, the learned curator of the British Museum, published an account of the gorilla in the Transactions of the Zoological Society of London, and in this he agreed with Dr. Jeffries Wyman, and retained the gorilla in the genus *Troglodytes.* Since 1848, that illustrious zootomist has written several memoirs, giving extended definitions of the anatomical structure of the gorilla.

Professor Duvernay and Professor Isidore Geoffroy St. Hilaire, of Paris, have written long memoirs on the comparative anatomy of this wonderful animal; and both, after very able scientific description, consider the differences in the osteology, dentition, and outward character of the gorilla to be of sufficient generic importance to create the genus gorilla. They give the trivial name of ngina to the animal.

Professors Duvernay, St. Hiliare, and Dr. Jeffries Wyman agree in putting the gorilla below the chimpanzee in its anthropoid character, while Professor Owen is of opinion that the gorilla is nearer akin to man than the T. niger or chimpanzee, and does not think that the anatomical peculiarities of the animal are sufficient to make a new genus. On this last point he agrees with Dr. Wyman.

The most important anthropoid characters of the gorilla, which are referred to by Professor Owen in his first memoir, are the following:—

"1st. The coalesced central margins of the nasals are projected forward, thus offering a feature of approximation to the human structure, which is very faintly indicated, if at all, in the T. niger, [or chimpanzee.]

"2d. The inferior or alveolar part of the premaxillaries, on the other hand, is shorter and less prominent in the T. gorilla than in the T. niger; and in that respect the larger species deviate less from man.

"3d. The next character, which is also a more anthropoid one, though explicable in relation to the greater weight of the skull to be poised on the atlas, is the greater prominence of the mastoid processes in the T. gorilla, which are only represented by a rough ridge in the T. niger.

"4th. The ridge which extends from the *ecto-pterygoid* along the inner border of the foramen ovale terminates in the T. gorilla by an angle or process answering to that called 'styliform' or spinous in man, but of which there is no trace in the T. niger.

"5th. The palate is narrower in proportion to the length in the T. gorilla, but the premaxillary portion is relatively longer in the T. niger."[*]

In 1849, Dr. Wyman, in referring to the above memoir of Prof. Owen, says, in refutation, and claiming for the chimpanzee a nearer affinity to man: "If, on the other hand, we enumerate those conditions in which the enge-ena [gorilla] recedes farther from the human type than the chimpanzee, they will be found by far more numerous, and by no means less important.

"The larger ridge over the eyes, and the crest on the top of the head and occiput, with the corresponding development of the temporal muscles, form the most striking features. The submaxillary bones articulating with the nasals, as in the other quadrumana and most brutes; the expanded portions of the nasals between the frontals, or an additional osseous element of this prove an independent bone; the vertically broader and more arched zygomata, contrasting with the more slender and horizontal ones of the chimpanzee; the more quadrate foramen lacerum of the orbit; the less perfect infra-orbital canal; the orbits less distinctly defined; the larger and more tumid cheek-bones; the more quadrangular nasal orifice, which is depressed on the floor; the greater length of the ossa palati; the more widely expanded tympanic cells, extending not only to the mastoid process, but to the squamous portion of the temporal bones—these would, of themselves, be sufficient to counterbalance all the anatomical characters of the (enge-ena) gorilla.

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[*] Op. cit., vol. iii., *Transactions of the Zoological Society*, 1848.

"When, however, we add to them the more quadrate outline of the upper jaws; the existence of much larger and more deeply grooved canines; molars with cusps on the outer side, longer and more sharply pointed; the dentes sapientiæ of equal size with the other molars; the prominent ridge between the outer posterior and the anterior inner cusps; the absence of a cristagalli; a cranial cavity almost wholly behind the orbits of the eyes; the less perfectly-marked depressions for the cerebral convolutions; and, above all, the small cranial capacity, in proportion to the size of the body, no reasonable grounds for doubt remain that the enge-ena occupies a lower position, and consequently recedes farther from man than the chimpanzee."

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Professor Owen says: "In the greater relative size of the molars compared with the incisors, the gorilla makes an important closer step toward man than does the chimpanzee. * * * * * * * * * * *

"In the chimpanzee the four lower incisors occupy an extent equal to that of the first three molars, * * * * while in man the four are equal to the two first molars and half of the third. In this comparison, the term molar is applied to the bicuspid."[*]

"The proportion of the ascending ramus to the length of the lower jaw tests the relative affinity of the tailless apes to man.

"In a profile of the lower jaw, compare the line drawn vertically from the top of the coronoid process to the horizontal length along the alveoli: in man and the gorilla it is about seven-tenths, in the chimpanzee six-tenths.

"*Every legitimate deduction* from a comparison of cranial characters makes the tailless *quadrumana* recede from the human type in the following order: gorilla, chimpanzee, orang, gibbon."[†]

Professor Isidore Geoffroy St. Hilaire makes a new genus for the gorilla, which he has named Gorilla, and has called the only species of the genus thus named *ngina*. This arrangement he bases on the following structural peculiarities:—[‡]

"The study of the general conformation of the head of the gorilla, of the proportions of his limbs, and consequently of the general conditions of station and progression, such as conformation of the hands and the structure of the molars of the lower jaw, lead us to the conclusion, which is confirmed by many secondary facts, that he does not belong to the genus

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[*] Owen, p. 83.

[†] Ibid., p. 84.

[‡] See page 37, *Archives du Muséum d'Histoire Naturelle*, tom. x., liv. i. and ii.

Troglodytes. The animal constitutes in fact a distinct genus, to which the name Gorilla proposed by me, a few days after a specimen of the ape reached France, properly belongs.

"The following are the principal characters of this genus:—

"Head round in the young, but in the adult long, much compressed, and cranial crests very prominent. *Ears small,* in form resembling those of man.

"*Upper extremities long,* (but much less than in the orangs and gibbons,) reaching, when the animal stands upright, nearly to the middle of the leg.

"*Hands wide.* By this character it is distinguished as well from the orang as from the chimpanzee. The palm in particular nearly as wide as long, (a proportion almost exactly resembling that in man,) *fingers short* as compared with those of man and of the chimpanzee.

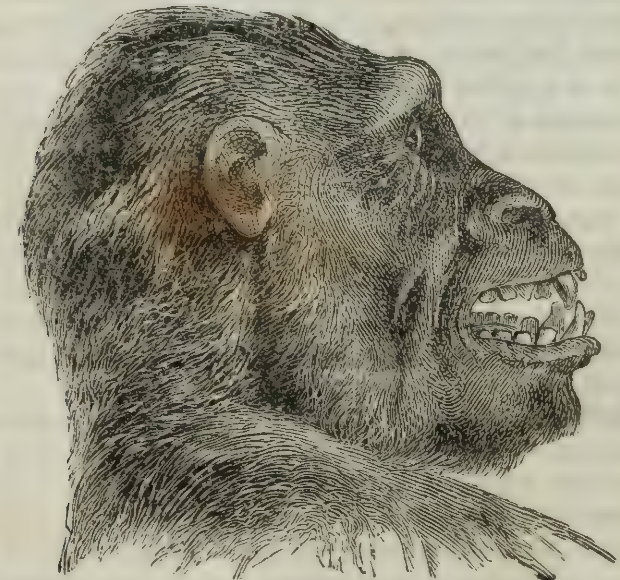
"Feet long, *the three intermediate toes* (in the male) *reunited by integument as far as the second phalanx,* nails of both fingers and toes much flattened, a form previously found only in man and the chimpanzee.

"*Canine teeth very large;* incisors nearly in straight line; the three *molars, on each side of lower jaw, prolonged and ridged in line of antero-posterior diameter.*

"Characters which especially distinguish the genus Gorilla from that of the Troglodytes are printed in italics."

For these and other reasons, Prof. St. Hilaire makes of the gorilla the *genus* Gorilla, and places it nearer the *Simians* in some respects than the *Troglodytes niger.* His arrangement or order is as follows: *Homo, Troglodytes, Gorilla, Simia, Hylobates.*

The eyes of the gorilla are deeply sunken, the immense overhanging bony frontal ridge giving to the face the expression of a constant savage scowl. The mouth is wide, and the lips are sharply cut, exhibiting no red on the edges, as in the human face. The jaws are of tremendous weight and power. The huge canines of the male, which are fully exhibited when, in his rage, he draws back his lips, lend additional ferocity to his aspect. In the female these canines are smaller.



GORILLA'S HEAD.

The almost total absence of neck, which gives the head the appearance of being set into the shoulders, is due to the backward position of the juncture of the head with the trunk. The brain-case is low and compressed, and the lofty ridge of the skull causes the cranial profile to describe an almost straight line from the occiput to the supra-orbital ridge. The immense development of the temporal muscles which arise from this ridge, and the corresponding size of the jaw, are evidences of the great strength of the animal.

The eyebrows are thin, but not well defined, and are almost lost in the hair of the scalp. The eyelashes are thin also. The eyes are wide apart; the ears are smaller than those of man, and in form closely resemble the human ear. They are almost on the same parallel with the eyes. In a front view of the face the nose is flat, but somewhat prominent, more so than in any other ape; this on account of a slightly projecting nose-bone. The gorilla is the only ape which shows such a projection, and in this respect it comes nearer to man than any other of the man-like apes.

I must own that, at first sight, judging from the living specimen and from its cranium, the gorilla presents all the features of a far more bestial animal than the *T. calvus*, *T. kooloo-kamba*, *T. niger*, or the *orang*. All the features of the gorilla, especially in the male, are exaggerated; the head is longer and narrower; the brain is backward; the cranial crests are of immense size; the jaws are very prominent, and show great power; the canines are very large. The proper cavity of the brain is marked by the immense occipital ridges. But the remainder of the skeleton of the gorilla comes much nearer to that of man than that of any other ape.

And, after a careful examination of the osteological facts which have been mentioned; after having observed the live gorilla and studied carefully its mode of progression, I came to the conviction that in its mode of progression the gorilla is the nearest akin to man of all the anthropoid apes.

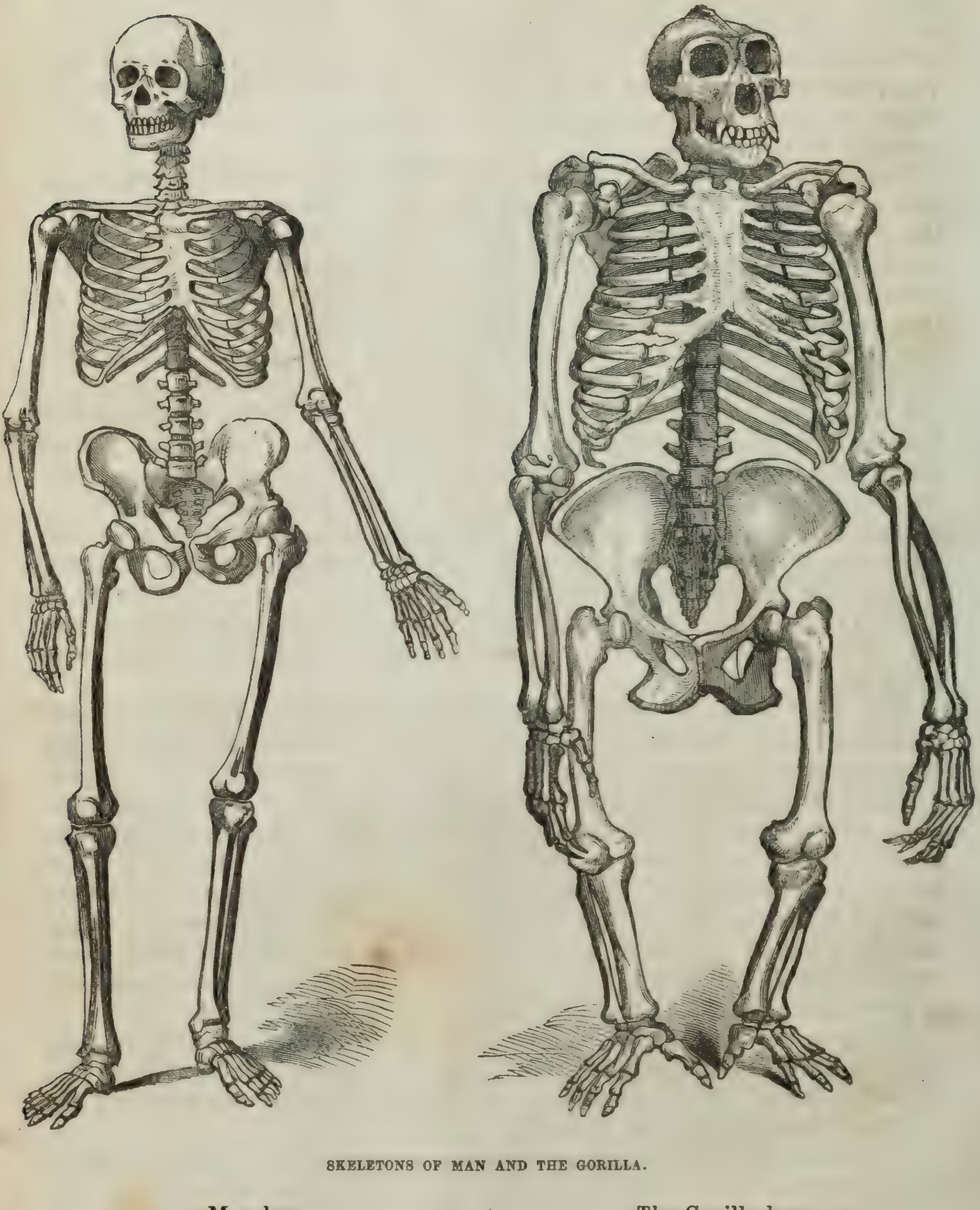
In size the gorilla varies as much as does man. Adult male gorillas measure from five feet two inches to six feet two inches. Part of a skeleton in the possession of Dr. Wyman shows that the animal might have reached the latter size when extended on the ground in a perfectly straight position; but as the gorilla is unable to stand erect, the legs being somewhat bent and the body thrown forward, the largest specimen would not *appear* higher than five feet nine inches.

To show the reader the contrast between the bony structure of man and the gorilla, I place diagrams of their skeletons side by side on the following page. The accompanying table of measurements shows the points of similarity and of difference:—

The T. calvus has sometimes fourteen pairs of ribs. Man has sometimes thirteen pairs of ribs; but what is termed ribs are vertebral elements, which are so called when long and free, and this is merely due to the coalescing of the last lumbar to the first sacral vertebræ.

The cervical series departs most from that of man. All the apes possess the same number of vertebræ as man.

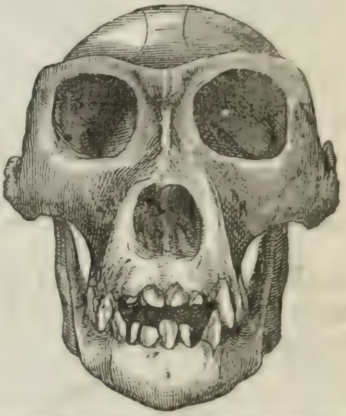
The gorilla skeleton, *the skull excepted*, resembles the bony frame of man more than that of any other anthropoid ape. In the form and proportions of the pelvis, the number of ribs, the length of the arm, the width of the hand, and the structure and arches of the feet—all these characteristics, and also some of its habits, appear to me to place the gorilla nearer to man than any other anthropoid ape is placed.



SKELETONS OF MAN AND THE GORILLA.

Man has	The Gorilla has
12 (and sometimes 13) pairs of ribs.	13 pairs of ribs.
7 cervical vertebræ.	7 cervical vertebræ, (the true vertebræ.)
12 dorsal do.	13 dorsal do.
5 lumbar do.	4 lumbar do.
5 sacral do.	5 sacral do.
8 carpal (wrist) bones.	8 carpal (wrist) bones.

Among all the anthropoid apes, the number of teeth corresponds with that in the human species, but the canines are much larger, especially in the male gorilla. The incisors also are large. In the ape the bicuspids are implanted by three distinct fangs, two external and one internal, and the external one is divided. In man they are implanted by one external and one internal; and in the Caucasian race the two fangs are sometimes united.

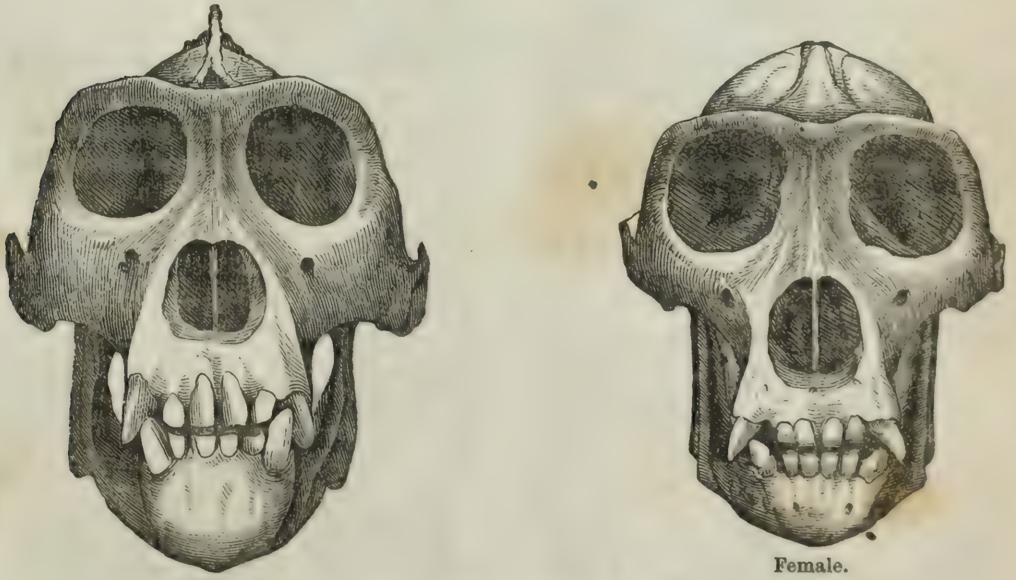


FRONT VIEW OF A YOUNG GORILLA'S SKULL.

The skull here represented is that of a gorilla shedding his milk teeth. The upper incisors have fallen, and the four permanent ones of that jaw have made their appearance, while in the lower jaw the two lateral milk or first incisors are yet firmly in place, and the two central incisors of the second growth have made their appearance and are half grown.

The milk or first canines are yet firmly in place, and, on extracting one of them, the nucleus of the second or permanent tooth is scarcely discoverable. On withdrawing one of the bicuspids and one of the first molars of the lower jaw, the rudiments of the permanent ones are perceptible. In the upper jaw, the first set of bicuspids and molars have already been displaced by the permanent set, and the four wisdom teeth of this jaw have already made their appearance, and are in a more advanced condition than in the lower jaw.

The large ridge over the eyes and the crest on the top of the head, and extending over upon the occiput, together with the corresponding development of the temporal muscles and the large canines, are the main outward characters which seem to remove the gorilla farther from man than the chimpanzee, and give to this animal so ferocious a look.

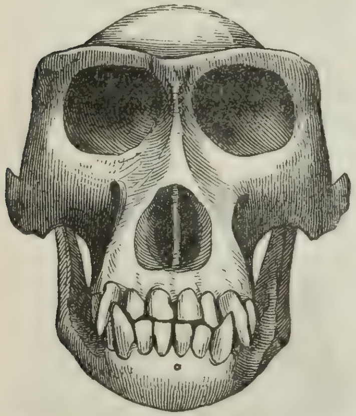


Male.

Female.

FRONT VIEW OF GORILLA SKULLS.

But in the *female* gorilla the canines are not much larger, in proportion to the relative size of the animals, than in the chimpanzee; the frontal and occipital ridges of the head are but slightly marked.

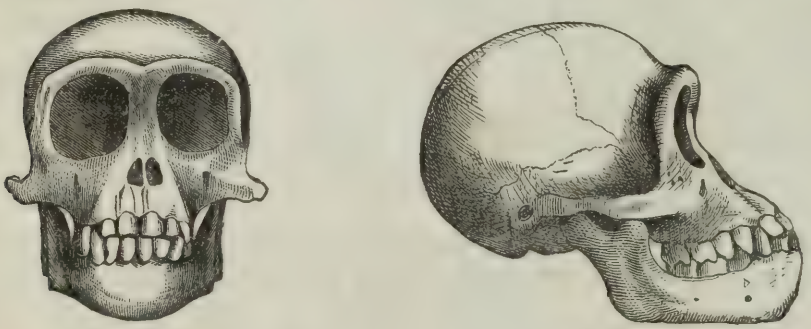


FEMALE OF THE "RED RUMP" VARIETY.

In the female gorilla "with the red rump," the head of which seems somewhat deformed, the space between the eyes is much narrower.

The skulls of the *T. niger*, or chimpanzee, and *T. calvus* (nshiego mbouve) are smaller and rounder than that of the gorilla, and show more capacity relatively to their size than that of the male gorilla, but I think not much more than that of the female gorilla. That of the kooloo-kamba has a greater relative capacity than *any* other of the apes.

The corresponding small amount of brain in the male gorilla, and the excessive preponderance of the cerebellum or back brain, would seem to corroborate our opinion of the excessive brutality of this beast.



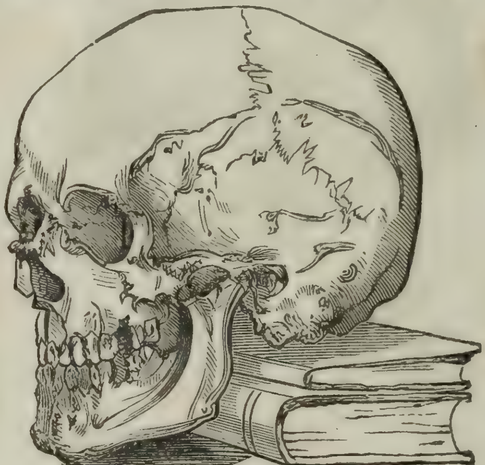
Front View. Side View.

SKULL OF YOUNG T. CALVUS.

The changes which occur in the development of the female gorilla's skull from early youth to adult life are not so great by far as they are in the male gorilla's skull, which may be called a complete metamorphosis.

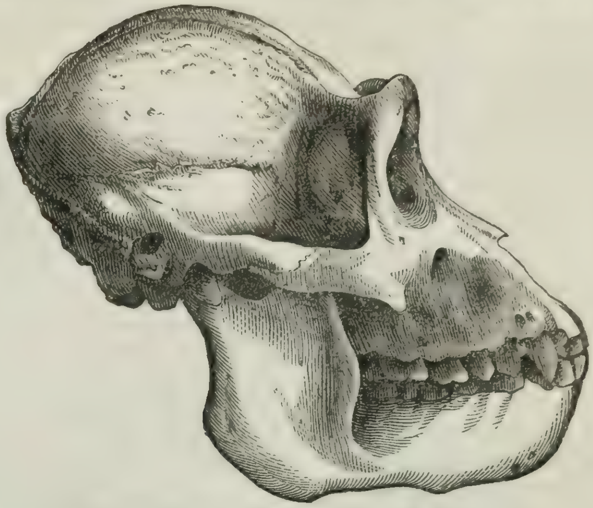
The skulls of *young* gorillas, female and male, and of the young of the chimpanzee and other apes, are much alike, and could hardly be recognized one from another. When young, the head is more round and more human. As the animal grows older, the occiput becomes long and com-

NEGRO SKULL.

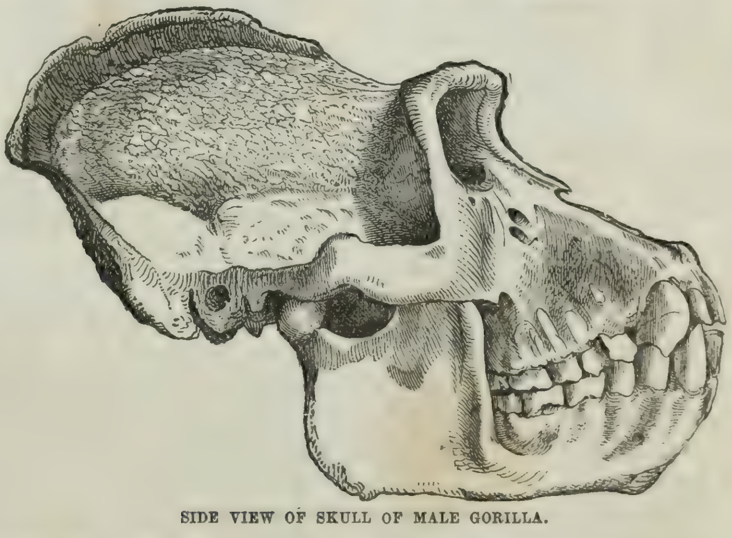


CAUCASIAN SKULL.

pressed; the muzzle becomes large and projecting; the frontal ridge, which was small, becomes prominent; and the crests and occipital ridges, which are not seen in the young, become enormous in the adult male gorilla. This appears to be, as it doubtless is, an effectual defense of the monstrous skull against the dangers of ferocious conflicts.



SIDE VIEW OF A SKULL OF FEMALE GORILLA.



SIDE VIEW OF SKULL OF MALE GORILLA.

By the following table of measurement, the reader can form an idea of the comparative cranial capacity of the different apes of Africa. The measurements are by my friend Professor Jeffries Wyman, of Boston.

CRANIAL CAPACITY OF ADULT CHIMPANZEE, NSHIEGO, AND KOOLOO-KAMBA.

		Cubic Inches.	Authority.
I.	Chimpanzee	26	Dr. J. Wyman.
II.	“	24	“
III.	“	22	“
IV.	Nshiego.	22	“
V.	Kooloo-kamba	25	“
VI.	Chimpanzee	20	“
VII.	Nshiego.	18	“
VIII.	“ (young)	21	“

From this it will be seen that the cranial capacity of the kooloo-kamba and nshiego is intermediate between the two extreme measurements of the chimpanzee.

CRANIAL CAPACITY OF GORILLA.

		Cubic Inches.	Authority.
I.	Male	34·5	Dr. J. Wyman.
II.	"	28·3	"
III.	"	28	"
IV.	"	29	"
V.	"	26	"
VI.	Female	29·5	"
VII.	Male	27	Dr. S. Kneeland.
VIII.	"	32	Dr. J. Wyman.
IX.	"	32·6	Prof. Owen.
X.	"	30·3	Dr. J. Wyman.
XI.	Female	25	"
XII.	"	24	"
XIII.	"	29·6	"
XIV.	" young, shedding teeth.	20·5	"
XV.	Gorilla with red rump	19·5	"

I. and III. were obtained by Dr. George S. Perkins.
II. and XI. were obtained by Dr. T. S. Savage.
VII. was obtained by Rev. J. L. Wilson.
IV., V., VI., XII., XIII., XIV., XV. are from my own collection.
VIII. was obtained by the Rev. Wm. Walker.
IX. is in the Hunterian Museum in London.

Average of ten males	29·70	cubic inches.
" three females	26·00	"
" thirteen adults	28·85	"
Maximum	34·05	"
Minimum.	24·00	"

No. XI. is deformed, and is therefore not referred to in the averages.

The average weight of the brain of a child of four years, of the Caucasian race, having its first teeth, is 38 to 40 ounces. There are no measurements for this age. The average capacity of the adult Caucasian brain is 92 cubic inches, and the maximum is 114 inches.

The average capacity of the adult negro and Australian brain is 75 cubic inches. The average capacity of thirteen adult gorillas was but 28·85 cubic inches. This is an incontestible proof of the great ascendency of the intellectual life of the human species, even in the lower orders of the human family, which increases gradually, and possesses an activity of nutrition which tends to the continual development of that organ as long as the ossification and the sutures of the cranium are not complete, and which is not the case until man has attained the adult age; while even after that period it is known that the brain increases sometimes in weight.

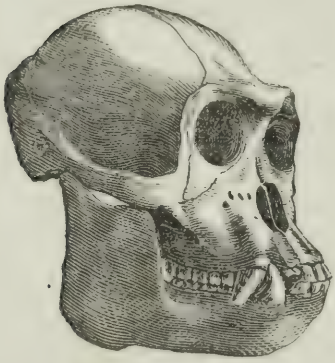
The cranial capacity of a *young* gorilla or nshiego—supposing a subsequent development equal in measure to that in man—would produce an animal of a high grade of intelligence. But this development does not take place. The actual increase in brain, in the adult gorilla, (or other anthropoid apes,) over the young, is very slight. The head increases in size and weight with age; but it is the bones, which grow into a hard, firm brain-case; the brain itself remains almost without increase in weight or size. This proves conclusively that the animal has very limited powers of intelligence; and, from my own observations, I believe that the limit of that intelligence may be reached in a single year of its life.

Comparing the skeletons of the *T. calvus*, or nshiego mbouve, and T. kooloo-kamba with the *T. niger*, it does not strike me that their differences are of generic importance, especially when it is remembered how much individual gorillas differ in size and in proportions.

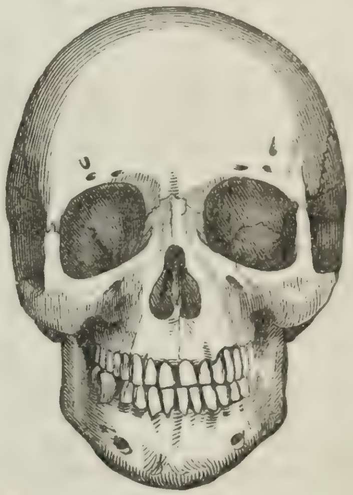
The skull of the kooloo-kamba is much broader than that of either the chimpanzee or *calvus*. In the kooloo-kamba the incisors strike squarely upon each other, and present a broad, grinding surface.

Measured from the supra-orbital ridge above the eyes backward to the occipital ridge, the plane dividing that section of the skull would have more than one-third of the brain superior to that line. The bis-temporal diameter is greater in proportion than in either the gorilla, the chimpanzee, or the *calvus*.

The kooloo-kamba skull being placed *in situ* upon the lower jaw, the whole head preserves, unsustained, its erect position.



KOOLOO-KAMBA SKULL.



HUMAN SKULL

The peculiar development of the cheek-bones gives a great breadth to the face; the muzzle is not so prominent as in the other apes; the head is rounder; the capacity of the cranium is greater than the nshiego, as shown by the table of measurement of the crania. The skull approaches somewhat nearer in shape to the human skull.

* * * * * * * * *

Dr. P. Gratiolet, in a very able paper, read before the *Société d'Anthropologie* of Paris, on microcephalus considered in its relations to the characteristics of the human race, has the following remarks :—

"The study of the brain of microcephalic persons [or small-brained persons] has provided me with other elements, by the aid of which the absolute distinction of man is evidently and anatomically proved. In comparing attentively the brain of monkeys with that of men, I have found that, in adult age, the arrangement of cerebral folds is the same in one group as in the other; and, were we to stop here, there would be no sufficient ground for separating man from animals in general; but the study of development calls for an absolute distinction."

Speaking of the anatomical development and structure of the brain, he then continues : "In fact, the tempero-sphenoidal convolutions appear first in the brain of monkeys, and are completed by the frontal lobe, while precisely the inverse order takes place in man; the frontal convolutions appear first, the tempero-sphenoidal show themselves last; thus the same series is repeated in the one case from *a* to *w*, in the other from *w* to *a*. From this fact, rigorously verified, a necessary consequence follows—no arrest in the progress of development could possibly render the human brain more similar to that of monkeys than it is at the adult age; far from that, it would differ the more the less it were developed."

Thus we see that, even in the lowest idiots, the brain preserves the material and zoological characters of man; and, though often inferior in appearance to that of the chimpanzee, gorilla, or orang, is nevertheless an undeniable human brain. Disease, or degradation in continued reproduction, (*astheniogeny,*) may dwarf a man, but will never make of him an ape; and, moreover, modern observations have demonstrated that idiots do not breed.

I close this chapter with the following tables of measurements of the gorilla head, carefully made from one of my most perfect specimens, an adult male, which, when first shot, measured five feet eight inches in extreme length.

MEASUREMENTS OF THE GORILLA'S HEAD.

Lower Jaw.

	Inches.
Length of the inferior maxillary bone, from the inferior angle of the ramus to the canine tooth	6
Do. to the median line measured around to a point between the middle incisors	7
Perpendicular height of the ramus of the jaw	4
Greatest breadth of do.	$2\frac{3}{4}$
Length of alveolus (in a straight line of the teeth)	$3\frac{5}{8}$
Width across the jaw from the outer margin of the last molars	$2\frac{5}{8}$
Do. do. at the canine or bicuspids	$2\frac{1}{4}$

Upper Jaw.

Length of alveolus from the last molar to the canine	$3\frac{1}{2}$
Do. do. around to the median line.	$4\frac{1}{4}$
Breadth across the jaw at the molars	$2\frac{3}{4}$
Do. do. at the extremities of canine.	$2\frac{7}{8}$

Skull.

Diameter of nasal aperture.	$1\frac{3}{4}$
Distance from lower margin of do. to the margin of the eye-socket	3
Width of the face, measured across the eyes to the outer margins of the lateral orbital ridges	$5\frac{1}{2}$
Width of the face, measured at the molar protuberances	$6\frac{1}{2}$
Depth of the eye-socket to the optic foramen	$2\frac{7}{8}$
Greatest length of the face, measured in a straight line from the summit of the orbital ridge to the lowest point of the chin	$7\frac{1}{2}$
Distance from the base of the nose to the top of the orbital ridge on the median line	$2\frac{1}{2}$
Distance from do. to the outer angle of do.	$3\frac{1}{2}$
Distance on the median line from the middle incisor of the upper jaw to the foramen magnum (spinal opening)	$7\frac{1}{2}$
Diameter of the foramen magnum, or spinal opening	$1\frac{1}{4}$
Distance from the posterior margin of that opening to the lateral termination of the occipital crest	$3\frac{1}{2}$
Distance on the median line, measured from the middle incisor of the upper jaw, across the spinal opening, to the outer point of the occipital crest.	$12\frac{1}{4}$
Transverse diameter of the base of the skull from the mastoid protuberances	6
Length of the *occipital crest* on its summit	11
Greatest height of this crest, measured perpendicularly from the surface of the skull	1
Length of the *median crest* on the top of the skull	5
Distance from the summit of the orbital ridge to the *point of junction of the crests* on the occiput	7
(Measured from the highest points of the orbital ridge and the occipital junction of the crests, a line will not touch the skull.)	
Measurement around the entire skull, within the zygomatic arch, on the depressed line just posterior to the eye-sockets, and anteriorly to the crests	11
Lateral diameter of the space beneath the zygomatic arches	2
Antero-posterior do. do.	$2\frac{3}{4}$

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Lecture on Dentition and its Derangements. By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics in the N. Y. Med. College.—"In order to complete the anatomical and physiological part of our subject, let me proceed to some remarks on the permanent teeth. You remember, from my previous lecture, what I said, following the description of the process as given by Harrison, on the first formation and development of the temporary ones. Soon after the commencement of the saccular stage of the deciduous teeth, the rudiments of the second or permanent set are developed. About the fourteenth week of fœtal life the deep portion of the primitive dental groove is closed in, and contains the sac and papillæ of the ten milk teeth; the upper or superficial portion of the groove remains open, and is then named *secondary dental groove.* In this commence the rudiments of the permanent teeth. At first a small depression is observable behind the superior openings of the milk sacs; this increases, and forms the *cavity of reserve.* These cavities are lined by an inflection of the mucous membrane, and at the bottom of each a small papilla is formed; they gradually recede from the surface, and are thereby converted into follicles, and finally into closed sacs, which lie to the inner side of, and in close contact with, the former set, and inclosed in the same submucous tissue. The necks of these sacs, by which they originally communicated with the general mucous membrane, continue as obliterated cords leading to the surface of the gum, internal to the deciduous teeth. These cords have been named the *gubernacula* or *itinera dentium,* roads of the teeth, without having, however, any such office as the name would appear to apply. The primitive dental groove, behind the posterior deciduous molar, does not close so soon as the anterior portion, and in it are developed, about the fifth month of fœtal life, the follicle and papilla of the anterior permanent molar. After its follicle has closed, the dental groove closes over it, leaving a space between the gum and the sac of this tooth; in this is a cavity of reserve of mucous membrane for the second permanent molar, and one also for the third molar or wisdom tooth. As the deciduous sacs, as well as the anterior permanent ones, increase in size more rapidly than the bones can elongate, this cavity for the permanent molars is pressed backward into the maxillary tuberosity above, and into the root of coronoid process below; but in a few months after birth, as the jaws increase in size and length, the first permanent molar returns to its proper level in the dental range; the cavity of reserve behind them dilates into the space the first molar occupied, and in it is developed the papilla for the second permanent molar. In the course of time, as the jaws further elongate, this tooth advances and descends, and the remainder of the cavity of reserve dilates behind for the third permanent molar or wisdom tooth.

"The permanent sacs at first receive their vessels from those of the gum, but afterward from the temporary sacs; and as they retire into their own cells, these new vessels enter into new dental canals, which become permanent. In the course of a few years, and after all the temporary teeth have appeared, the further elongation of the jaws admits of space for the first true molar to protrude; this usually occurs between the sixth and eighth years, and sometimes even sooner. At this age there are fifty-two teeth in the two jaw-bones, viz., twenty deciduous teeth, twenty permanent beneath these, and the twelve posterior molars; and when all the anterior permanent teeth have become enlarged they press upon the anterior wall of their alveoli, which soon undergo absorption; and then each tooth comes a little forward into the lower part of the alveolus of the milk tooth; the fangs of the latter are absorbed and gradually wholly removed, and then the crown falls out of the sac and the permanent tooth supplies its place. The cause of the disappearance of the roots of the temporary teeth is sought for in the loss of nutrition from the pressure of the *subjacent* permanent tooth, and perhaps in contemporaneous increase in the general injection and nutrition, bringing on liquefaction and absorption. Some pressure is necessary, at all events, for whenever there is no pressure from below, the temporary tooth is not removed. But you must not imagine that the permanent tooth exercises any immediate pressure on the blood-vessels, thereby depriving the temporary tooth of its nutrition; if this was the case, the permanent tooth would exercise just the same influence at a much earlier period, even while the temporary itself was not fully developed. The crowns of the permanent molar teeth, further, are perfectly unable to exercise any pressure on the blood-vessels of the temporary, as they are situated between their roots. The nutrition of the temporary teeth is impaired by two facts, first by the increasing development of the permanent themselves, and further by the development of the maxillary bones, which contract and partially obstruct the canals through which the branches of the maxillary artery penetrate to the tooth. The pressure of the permanent tooth on the temporary one is not at all direct; nor is it necessary that it should be so. Nature usually, in building up and destroying, works very slowly and invisibly. A fine instance of what a slight pressure for a protracted period may effect, and how bones are absorbed from the pressure of a slight physical influence, is given in the fact, that aneurisms of large arteries at some parts of the body, where they are in the neighborhood of bones, destroy the bone by slow gradual absorption. Thus aneurisms of the aorta are reported to have produced absorption of part of some spinal vertebræ, and I have myself seen two or three costal cartilages absorbed from the constant hammering against the chest by a large aneurism of the ascending aorta. You see, therefore, that the pressure of the permanent tooth inclosed in its cell, on the wall separating it from the temporary tooth, it being slowly and continually forced upward, may be deemed sufficient to bring the root of the temporary tooth to absorption. The effect of the permanent teeth is not in one direction only, for you know that the permanent teeth are not situated in the same horizontal line; the steady slow pressure is exercised upward and laterally, thus the roots of the molar teeth are absorbed on their inner sides; and the middle permanent incisors press not only on the corresponding temporary, but the lateral ones also. The root of the temporary tooth, while being deprived of its normal nutrition by pressure exercised on the periosteum, is liquefied by the increased action in the surrounding parts, brought under the influence of the numerous absorbent vessels contained in the sac of the onward growing tooth, and excreted like so many other effete matters. The vessels rendering this service to the organism have been made the subject of particular study by Boardet, who called them 'appareil dissolvant,' and Delabarre, that learned humbug, and nostrumseller, who comprehends them under the name of 'appareil absorbant.' This resorption can take place as long as the root is in some connection with the surrounding parts. If it ceases to be so, the vital powers of absorption are replaced by another; in this case the root has the general effect of a foreign body brought by some means or other into contact with and imbedded in the organism, to produce inflammation and to be removed by suppuration. Thus no resorption takes place even when the crown of the permanent tooth comes into immediate contact with the root of the temporary; in which cases the temporary teeth, particularly the molar, are found to be turned over and produce, by the effect of their sharp roots, deep ulcerations in the cheek, which will not heal before the temporary tooth is removed.

"The permanent teeth appear no more nor less at regular periods than the temporary ones. About the seventh year, or earlier as I mentioned before, the first permanent molar appears, nearly about the time when the first temporary incisors are replaced by the permanent. After all the incisors are changed, the anterior and posterior temporary molars are successively shed and replaced by the permanent bicuspides; the canines are changed about the tenth or eleventh year. About the twelfth or thirteenth the second permanent molars appear; the last molars, or wisdom teeth, usually some time between the twentieth and thirtieth.

"Ossification* requires but a short time in the deciduous teeth, and longer in the permanent. A permanent incisor requires seven years, a canine twelve, a molar from eight to ten years. Ossification commences at the very same time in incisors and the first molars, as is proved by the dissection of the jaw-bones of infants who died in the first months after birth. It progresses more rapidly in the female than in the male sex; girls, therefore, have their permanent teeth sooner than boys.

"In the lower jaw of a child three years of age, the permanent teeth are still in an oblique direction. Only the middle incisors, which are the highest, are in a nearly vertical position; the lateral incisors are situated more inward, and more obliquely; the lowest are the canine teeth. Higher, and between the roots, we find the molar teeth in their first stages of development, or rather the first one; for as to the second, we find nothing but the cells in which it will be contained in future. The time of its first formation is about the fifth year. As it requires about eight years for its complete ossification, it makes its appearance about the thirteenth year of life. The commencement of ossification in the third molar tooth, and particularly its appearance, is more uncertain, as it depends on local circumstances. It does not usually appear before the twentieth year, but in some cases, according to C. Harris, does not show itself, until the thirtieth or even fortieth year, and Canton extracted one for a gentleman seventy-four years of age, who informed him that it was not out until he had attained his seventieth year.

"The maxillary bones of a child of from four to five years contain so many and so large cells for both the temporary and permanent teeth, that but very thin osseous walls form a bridge between the external and internal wall of the jaw-bones. Nevertheless, every tooth, both temporary and permanent, receives a ramification from the common maxillary blood-vessels and nerve. There is sometimes, according to Delabarre's observation, an anomaly in the lower jaw, of this sort, that the submaxillary artery and nerve, right at their entrance into the lower maxilla, divide into two branches, one of which feeds the temporary, the other the permanent teeth. The periosteum of the alveolar cell, being a mere continuation of the external periosteum, takes its blood-vessels from the maxillary artery, branches of which penetrate the porous osseous substance.

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* Odontification?—Z.

"A very interesting subject relating to our investigations is that of the so-called third dentition. Is there at all a third dentition? Are those teeth which we are used to call permanent, not permanent, but subject to be temporary only in proportion to those which are to be as it were more permanent? Certainly there are a number of cases reported, in which the teeth are said to have fallen out twice, and to be replaced twice. There is one case even of the following description: In a girl the first replacement, the second dentition, took place at six years, the third dentition at twelve; this latter was complete in a single year. This case, our author says, 'is highly interesting for two reasons: first, because it occurred in a young individual, while cases of third dentition have been hitherto related of old people only; second, because all the teeth were replaced here by others, while the third dentition has always been incomplete, and limited to the appearance of two or three teeth only.' The case, gentlemen, looks so very interesting and beautiful, that I am afraid the reporter is greatly mistaken, or has been grossly imposed upon. Other cases of third dentition are reported, but scarcely any of such a remarkable kind as this one. At all events, we require a good deal of belief in the veracity or the judgment of a writer, if we are to take as scientific facts such reports as are in open conflict with the known laws of anatomy and physiology. W. Jackson has the cases of a man of sixty-four, and of a woman of eighty years, in whom a third set of incisors was observed; in one of them the old teeth had just fallen out to make room for the new ones. Sorgoni reports the case of a boy exhibiting a third dentition before he was twelve years of age, and Andral has collected from literature twelve cases of the same anomaly. Lison reports the case of a boy, Eugene Cavillan, thirteen years old, of young and healthy parents, of good constitution and well, and without any anomaly in his general development. The second dentition took place when he was nine years old. Soon after, all his twenty-eight teeth were replaced by others; the same occurrence took place between his tenth and eleventh year, and again between the eleventh and twelfth. When the case was reported by the author, the boy was said to be in his thirteenth year; at this age a new set of teeth was being developed; the first inferior molar tooth of the right side fell out, to give way to another that was already visible. The teeth that had fallen out had no roots, which appeared to be eroded. The removal and replacement took place always in the usual order, the teeth being small, white, and of normal shape and position. The gums were red and somewhat tumefied, and the general health of the boy satisfactory.

"I consider it a characteristic occurrence that curiosities like those alluded to are more numerous in old, very old books, than in modern one. Storch, alias Pelargus, who wrote in 1750, reports the case of a lady of seventy years, who, after having lost all her teeth for a number of years, had a new incisor at that advanced age. He further has the case of his own daughter, who cut five molar teeth in her twentieth year; lost them all, and had new ones in their place when she was thirty-eight years old. Before this time, our author says, the lady was always sick from this abnormal teething—the symptoms enumerated, however, being evidently of uterine and hysteric nature; but after the last teeth cut, she became healthy, and strong, and fat. Old Paulinus relates the case of a Countess of Detmond, who lived up to a third dentition, in 1589, and grew one hundred and forty years old. The younger Pliny has the observation of the last molar tooth appearing at eighty years of life; Schottus at forty years, in a physician of his acquaintance; Cardanus, the celebrated mathematician and inventor of the Cardanian Formula, is reported to have cut a tooth at forty-three; several soldiers at forty-three, forty-four, and forty-five; several others, according to Sennertus, at sixty-three, seventy-five, eighty, eighty-one, eighty-eight, even at one hundred and four years of age. In an old book of 1725, there is the case of a woman of sixty-six years, who got not only new teeth, but new brown hair, instead of her former gray. Johannes G. Slevogt reports, in 1733, the case of a captain who cut new teeth at ninety-four years of age, and died soon afterward; we do not learn whether the old man died in consequence of teething, or whether, if he had not teethed again, he would not perhaps have lived up to our times, and been still older than ninety-four. But the greatest curiosity I have ever been able to hunt up is the following, reported by Möllenbroc, a century and a half ago. There lived at Leipsic a noble lady who had five children; with every confinement she cut a molar tooth. As soon as one of her new teeth got loose, the child who was born at the time when it was cut, was affected with some severe disease. If such a tooth fell out, she was always certain that the corresponding child was surely going to die. And so it happened, adds our honest author, all the three children died before the mother. Thus you perceive, gentlemen, that as it is said to be customary now-a-days that children die from their own teething, it was customary for children in olden times to perish from the dental troubles of their mothers.

"Both Courtois and Aimonino have published cases in which a third dentition took place after the permanent teeth fell out; Courtois is of the opinion that the third dentition is observed in the incisors only. If such was the case, why, we must expect that the teeth of the third period were formed contemporaneously with those which were then eliminated by the growth and onward pressure of the subjacent ones. At all events, the belief in a third dentition was so general formerly that decayed teeth would be removed in the hope that a replacement would take place. Professor Nessel, whose name I have mentioned before, has observed a girl whose middle upper incisors had been extracted in the hope that they would reappear. But not only no new teeth appeared, but the space in which two teeth had been seated formerly was so much intruded upon by the neighboring ones, that but one artificial tooth found sufficient room afterward. Now, what nature will not do in youth, she will hardly succeed in doing in old age, where all the reported cases of third dentition are said to have occurred. There is less probability of new germs of teeth forming and developing themselves in advanced life, than that there have been from the beginning supernumerary teeth; instances of which have been reported by Ruysch, besides those enumerated in my second lecture.*

"The fact that teeth will protrude, sometimes, at old age, is undoubtedly true. Instead of being, however, the symptoms of a renewed power of reproduction, they are, in Professor Nessel's opinion, frequently the results of regressive life; as they become visible after the diminution of the alveoli, and the decrease of the thickness of the gums. Such teeth were always formed, but were either invisible from being sometimes incuneated like the canine, or from being covered by an osseous mass, like the wisdom teeth. The second molar tooth, particularly, has been observed to reappear in advanced age, but only after the temporary second molar had kept its place, and fallen out at a very advanced period of life. It is not a very rare occurrence that the temporary second molar tooth remains at its place up to the fortieth year, and thus there can be no mystery nor wonder about the fact that another tooth will make its appearance afterward.

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* Dental Cosmos, vol. ii. p. 401.

"The temporary second molar tooth, however, is not the only one that will remain for a long period, and thereby retard the second dentition. Linderer reports the case of a girl who had her first permanent molar tooth with her eighth year, but whose second dentition did not begin before the fifteenth year. Another healthy and robust girl of fourteen years, who never had the four upper incisors, had all her other milk teeth, yet without there being any probability of an approaching change. Murat has the case of a robust young man of seventeen, who had all his milk teeth but five; and Bird and Maingault report similar cases. Other cases are noticed, by Linderer, of single milk teeth remaining up to the thirtieth or fortieth year; and Riecken gives the history of a man of eighty-five, who cut a number of incisors and molars, and is said to have suffered during his cutting a molar in his left lower jaw, from cerebral congestion, which was relieved, after local depletion had no effect whatever, by spontaneous hæmorrhage from the inner angle of the eye. Finally, a woman of forty-three years was observed by Düntzer, who had all her milk teeth left. After she had been suffering from intense pain in her head and upper jaws, from swellings of the gums, and diarrhœa, four teeth protruded behind the upper incisors; they were smaller and sharper, and troubled the functions of both mastication and articulation. After the lapse of a year, the same symptoms were observed in the right lower maxilla, which never had any molars before.

"Kneisel reports the case of a lady who reproduced four inferior incisors in her fifty-fourth year, after having worn artificial teeth for some time; and a right upper incisor, in place of one that had just fallen out, two years afterward. The teeth which had fallen out were undoubtedly the temporary ones that had never been removed, and finally fell out at an advanced age from being either pressed upward mechanically, or being decayed; nobody can say which, as the report does not contain anything beyond the facts I have related. Professor Hessel has the case of a lady who cut a fine white canine tooth at fifty years of age. This tooth became more visible from year to year, not because of its growth, but because of the decrease of the alveolar margins of the maxillary bone. It had been, in his opinion, always formed and ready to protrude, and would have done so but for the other teeth occupying the space naturally designed for it. The same author reports in his book on dentistry (1856) the case of a gentleman of thirty years, who still had his temporary upper incisors."—(*Amer. Med. Times.*)

"*On the supposed Influence of the Cementum in sustaining the Vitality of Transplanted Teeth.* By CHARLES VASEY, ESQ., L.F.P.S., Glasg., Dentist and Lecturer on Dental Surgery to St. George's Hospital.—The preparations in the Hunterian Museum that illustrate John Hunter's experiments of transplanting the teeth are of the greatest interest, as leading to a scientific solution of a result, hitherto unexplained, arising from certain accidental injuries of the teeth, and operations performed on them.

"Professor Owen says: 'In growing teeth, with fangs not fully formed, the cement is so thin that the Perkinjian cells are not visible; it looks like a fine membrane, and has been described as the periosteum of the fangs; but it increases in thickness with the age of the tooth, and is the seat and origin of what are called exostoses of the fang, which are wholly composed of it. These growths are subject to the formation of abscess and all the other morbid actions of true bone.'

"'It is the presence of this osseous substance which renders intelligible many well-known experiments of which human teeth have been the subjects, such as their transplantation and adhesion into the combs of cocks, and the establishment of a vascular connection between the tooth and the comb. The appearances which the Hunterian specimens of these experiments present, and of the reality of which Professor Müller satisfied himself during his visit to London, are no longer perplexing, now that we know that the surface of the tooth in contact with, and adhering to, the vascular comb, is composed of a well-organized tissue, closely resembling bone.'

"Now, if the union of transplanted teeth depends on the presence of the cementum, we can scarcely be prepared for the account of Hunter's experiments given in the catalogue of the College of Surgeons, or in Hunter's work on the Teeth, wherein he says: 'I may here just remark that this experiment is not generally attended with success; I succeeded but once out of a great number of trials.' It cannot for a moment be supposed that Hunter could overlook a difference in the mode of conducting his experiments that would account for his non-success in so many cases. We must therefore look, for the success of the one case, to some principle not recognized by Hunter, and this, I believe, will not prove to be the presence of the cementum.

"Before I had the opportunity of examining the Hunterian preparations, I felt certain that the tooth in the one successful case was a young tooth—that is, a tooth in which the root is not fully formed, the pulp cavity large, and the formative pulp present; and such I really found it to be. Yet such a tooth, as Professor Owen says, has little or no cementum, that substance being like a thin membrane in growing teeth. The very reverse is found in the preparation in the museum mentioned by Hunter as unsuccessful; the tooth in it is more fully formed, and the cementum proportionately greater; yet union has not taken place.

"Careful consideration of the whole subject of transplantation of the teeth, and considerable practical experience of cases of reunion, have thoroughly convinced me that the successful cases depend on the presence of the two formative organs, namely, the internal or dentinal pulp, and the external or cemental pulp; and that in all cases in which these are not present, or in which ossification is nearly complete, successful results are not to be anticipated.

"By this reading of Hunter's experiments we can understand necrosis as a result of slight injuries to the teeth, and shall also be able to avoid such a result in operations performed on them for the purpose of improving their relative position.

FIG. 1.

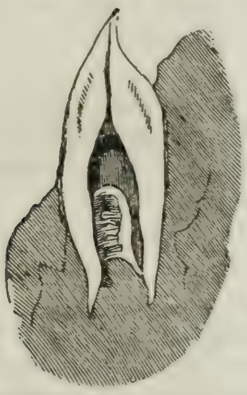


Fig. 1, the tooth of the Hunterian preparation, No. 47; the successful case of transplantation.

FIG. 2.

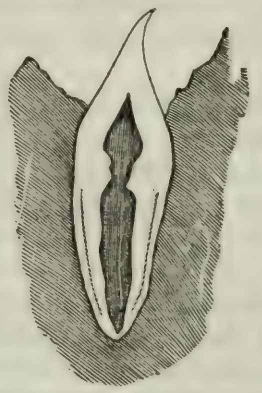


Fig. 2, the tooth of the Hunterian preparation, No. 49; the unsuccessful case of transplantation.

(Sketched from the Hunterian preparations, by permission of the Council of the Royal College of Surgeons.)

"Necrosis, as a result of slight injuries to the teeth, is of every-day occurrence, and is brought about in the following manner: after a blow from a fall or otherwise, the tooth loses its vitality, and gradually becomes of a dark color. In many cases, the gum and alveolar process are absorbed, when the tooth loosens and has to be removed. This absorption occasionally commences at the apex of the fang, and the tooth seems to be retained in its place for a time by a band of gum covering only a portion of the root of the tooth.

"Now, if the cementum were sufficient to support the vitality of a tooth, this unfavorable termination of a slight injury would not so frequently occur. Such cases, I believe, are best explained on the principle that ossification of the pulp, having progressed to that stage in which the aperture leading to the pulp cavity is at its minimum, the vessels, being ruptured by the force applied, recede, and cannot reunite.

"This view of the subject is also proved conversely by the fact that a tooth may be entirely removed from its original position without detriment, provided its removal be effected gradually. This is well illustrated by the following case, which is one out of many similar to it that might be given:—

FIG. 3.

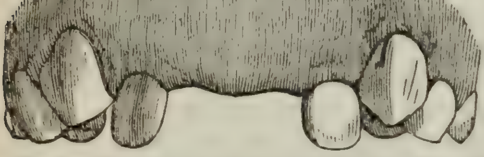


Fig. 3. Drawing from the mouth of a boy who lost the central incisors from a fall.

FIG. 4.

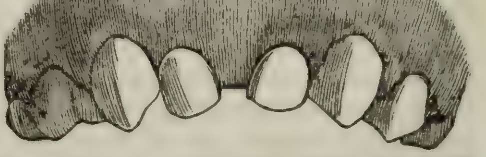
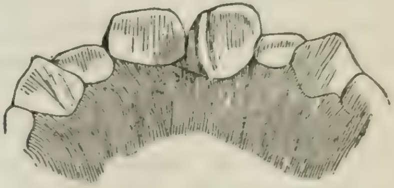


Fig. 4 shows the space nearly closed, the lateral incisors having been drawn together, by elastic cord, nearly into the position previously occupied by the central incisors.

"Among the operations that have been recommended and performed on the teeth, there is one almost identical to transplantation, and depends for success on the same principles. This operation is the seizing a misplaced tooth with the forceps, and at once turning it into its proper position; the tooth is then secured by ligature, or some mechanical contrivance previously prepared for the purpose. This proceeding has been recommended in cases of torsion, such as are represented by FIG. 5.

FIG. 5.



"Such an operation should never be performed when the development of the tooth has proceeded beyond a certain stage. And as there are no physical signs of the stage of development in any one individual tooth, I consider it to be questionable practice ever to resort to it. A slight mechanical contrivance, similar to the one used to retain the tooth in its new position, would prove sufficient to move it gradually, if an elastic ligature be used. The object sought would also be gained in nearly the same space of time as is required for the refixing of the tooth when forcibly turned.

"Faith in the power of the cementum to support the vitality of the teeth I believe to have led to errors in our practice. A correct reading of Hunter's experiments in the transplanting of teeth will suggest to every dentist such modifications as will lead to a safer and more uniform result."—(*Lancet.*)

"*New Anæsthetics—Theory of their Action.* BY CHARLES T. JACKSON, M.D.—Substitutes for ether, as anæsthetic agents, are frequently proposed, and some of them have been practically introduced, with some success. None, however, surpass ether in the two most important qualities of efficiency and safety, and there can be no doubt that with respect to safety, ether is far preferable to any and all anæsthetics thus far discovered.

"It may prove interesting to the profession to inquire into the mode of action of the class of bodies known to produce anæsthesia, when inhaled. This subject has been very carefully studied by me from the outset of anæsthetic practice, and with a view to the discovery of some general law.

"The first impression among physicians was that the anæsthetic state was merely one of temporary intoxication.

"Secondly, the theory of high excitement, followed by corresponding collapse, accounted for the phenomena. Dr. John C. Warren took, at one time, this view of the matter, and spoke of etherization as 'devouring the sensibility by high stimulation, and hence a corresponding nervous depression,' which was the anæsthetic state. Others have supposed that etherization produced a partial asphyxia; hence the expression early made use of by some of our surgeons, that there was 'little difference between hanging, drowning, and etherizing.'

"It has also been alleged that ether absorbed into the sanguineous circulation affects directly the nervous filaments, either at their origin in the medulla spinalis, or in their distributed extremities, or in both these parts. In support of this allegation, it was cited that the direct application of ether to an exposed nerve *destroyed* its sensibility. By the italization of that word, I call attention to the difference between the anæsthetic state of temporary suspension of sensibility, and the destruction of it; for the nerve acted upon directly by ether does not recover its powers, but is permanently paralyzed.

"Another state of the circulation has been observed, which it was hoped would give some clue to the action of anæsthetic agents—namely, that of slackening, and even temporarily wholly suspending the circulation of blood in the capillary or extreme vessels. It was supposed that by thus cutting off a supply of circulating blood stimulus to the sentient extremities of the nerves, sensation was temporarily suspended. The commencement of insensibility in the remote extremities, the feet, legs, and hands, seems to indicate that sensation was suspended at those points first.

"The French physiologists, Flourens and Longet, are of opinion that the effects of anæsthetics commence, and primarily act on the great nervous centres, the medulla spinalis and medulla oblongata; and that if the full effect reaches the bulb of the medulla, death will take place from total suspension of all the vital functions of the body.

"A more chemical explanation of the action of anæsthetics is, that they all abstract oxygen from the blood, and hence reduce its peculiar stimulating powers on the nerves, and that some of them leave poisonous products, while those left by others are innocuous. Thus, as we have formerly stated, chloroform or the ter-chloride of formyl abstracts three equivalents of oxygen from the blood, but, at the same time, unfortunately it deposits, in exchange for the oxygen, three equivalents of chlorine.

"Bi-sulphide of carbon, one of the most terrible anæsthetics ever proposed, the dangerous effects of which I have experienced, and have warned the public about seasonably, acts as a powerful de-oxidizer of the blood, both the carbon and the sulphur abstracting oxygen, the first producing carbonic oxide or carbonic acid, while the latter forms sulphurous acid. Carbonic oxide and sulphurous acid are poisons, as is also chlorine, before mentioned.

"All the acidiferous ethers when decomposed, as they are, in the organs of respiration and circulation, leave their acids in combination with the blood; hence, nitrous and nitric ether are known to destroy life, and hydro-chloric ether and chloride of hydro-carbon undoubtedly act in the same way, and injure the quality of the blood. Acetic ether is not objectionable, since an organic acid is easily decomposed in the processes of respiration, and is removed in the form of carbonic acid and vapor of water, usual products of normal respiration.

"Sulphuric ether, as it is improperly called, since it does not contain any sulphuric acid, is a pure hydro-carbon, with one equivalent of oxygen $=C_4\ H_5\ O$. When decomposed by the action of the blood, it may be converted into aldehyde, acetic acid, and lastly into carbonic acid and water, no fixed product remaining in the blood, but all able to be removed by respiratory action. The odor of the breath of a patient who has been etherized, shows that there are exhaled the oxidized products of the ether, and it is known by analysis that a much larger proportion of carbonic acid is exhaled from the lungs, during the etherized state, than in the normal condition of the system.

"Without finally adopting any theory of the chemical and physiological action of anæsthetics generally, we may, perhaps, be allowed to call attention to a general law, namely, that all very volatile hydro-carbons act as anæsthetics, like the others. Thus, it has long been known that benzine, benzole, oil of turpentine, naphtha, when inhaled, will all produce the anæsthetic state. The highly volatile oils of coal tar, likewise, possess anæsthetic properties, and one which has recently been tested in surgical practice, known as keroselene, a highly volatile naphtha, seems to be the least offensive of them. It is evidently a very pure hydro-carbon, analogous to highly rectified naphtha, and does not contain any oxygen, as is proved by its property of preserving potassium from oxidation, when it is immersed in it. The first samples of keroselene which I tested, two years ago, proved quite irritating to the organs of respiration; but I have learned recently that a purer and more volatile product has been made at Mr. Downer's works, though I have had no opportunity of testing it practically.

"It is obvious that there are two or more volatile oils in the keroselene of commerce, and they are separable by graduated distillation. Some care, therefore, is requisite in the preparation of a uniform product; one which may be properly the subject of experiments by inhalation. I would observe that no analysis has yet been made of the keroselene oils."—(*Boston Med. and Surg. Jour.*)

"*Remarks on Dentistry in the Army.* BY WM. B. ROBERTS, M.D., of New York.—The sad misfortunes of the Crimean war, owing to imperfect attention to the sanitary condition of the British army, opened the eyes of the whole civilized world to the importance of a proper sense of duty in this connection. It is not surprising, therefore, that humane and far-seeing men in this country should have taken an early opportunity in the present campaign, to press upon the government the almost incalculable importance of great care in the superintendence of the sanitary department of the army. Thus every effort is being made to attach to each regiment all the requisite force with all the necessary equipments to perform the work given to them in an efficient and satisfactory manner. There is probably very little to be said in the way of advice to such gentlemen as are thoroughly imbued with the importance of the subject, and as thoroughly acquainted with all the means and appliances necessary to it; but there is one point which has apparently escaped the attention of persons in authority, on which we wish to say a few words. During the last twenty years, and owing principally to the efforts of our own countrymen, dentistry has become elevated from a mere branch to a distinct science. Colleges have been founded, societies formed, conventions held, professorships endowed, and all to give the greatest insight possible into the structure, physiology, and pathology of the human teeth. It has been found, as men progressed in the study of these organs, that their disease spread its ramifications through the whole animal economy; all the functions of the body have been affected, and indeed suspended by the existence of a foreign and improper condition in the teeth; the whole sanitary condition has been altered, and the most serious complications of disease have attended the existence of diseased teeth.

"Thus dentistry has been taken out of the hands of the surgeons and doctors, and has formed a separate profession of enlightened, educated, and scientific men, understanding as a necessity not only their own immediate calling, but also no small share of surgery and pathological anatomy. A few years since, the question was raised in England as to the propriety of attaching dentists to the British army and navy; a great deal had been said upon the subject, and it was well known that the teeth of the soldiers and sailors were in a deplorable condition; but after a temporary prospect of success the subject was dropped. Meanwhile, in the French army, with that sense of decency that always characterizes the French nation, means had been taken to extend a proper attention to the wants of the body, and to the teeth; the men were supplied with brushes, and compelled to keep their teeth cleaned; and thus the matter stands in Europe at the present time. We have referred to this subject at the present time because it seems to us that it is proper that here, where dentistry has progressed more than in any other country, it is right that the first steps should be taken to still further advance it. And we desire especially to show the value that it might possess as a sanitary instrument, if proper efforts were made to invest it with the importance it deserves. It is almost needless to refer to the necessity for having good teeth in our army and navy—first, for mastication; and, second, but most important, for their effect upon the general health; and upon this last subject we desire to give some information.

"Careful mastication is essential to perfect digestion, and this latter, more especially in the active life of the soldier or sailor, is a primal necessity for healthy existence.

"Very few persons are aware of the derangements which may be produced by diseased teeth, although the period of dentition in children is generally considered as one of the most critical in life. It is, indeed, estimated by some writers, that one-tenth of all the deaths in the world occurs during the period of the first dentition. The animal frame is in infancy so delicate, that the least local irritation produces a sudden and universal sympathy throughout the whole body. Fever is a very frequent accompaniment of teething; also an affection of the skin, resembling measles; pustules sometimes appear, not unlike a mild form of small-pox; diseases of the scalp, diarrhœa, convulsions, diseases of the lungs; and in fact, symptoms of nearly every form of disease may be met with during the period, and resulting from dentition. If we know that this terrible catalogue of evils is attendant upon the growth of the teeth during infancy, is it not rational to suppose that a healthy condition of these organs is essential to adults, when we consider the close connection existing between the teeth, alveolar process, the parotid, submaxillary, and sublingual gland, on the one hand, and the mucous membrane of the mouth, which is continuous with that which lines the pharynx, œsophagus, stomach, and intestines, on the other? It is well known to the dental practitioner, the physician and surgeon, that if a tooth becomes diseased, all these organs will to a certain extent sympathize with it, independent of the agonizing and excruciating pain caused by the exposure of the nerve. Cases have been given where inflammation of the mucous membrane has extended so far as to produce consumption; while dyspepsia with all its attendant horrors may be, and often is caused by improper and insufficient mastication, which must necessarily result from the possession of poor and imperfect teeth. Neuralgia and *tic-douloureux*, probably the most fearful pains which the human race ever suffers, often proceeds in the first instance from exposed nerves; and other acute and chronic inflammatory diseases frequently spring from carious teeth and diseased gums, ruining health, and disabling their victims from performing even the most simple duties of life; and in the case of the soldier who is exposed night and day to every variety of inclement weather, and every quality of fare, the chances of such diseases establishing themselves through the means of diseased teeth are greatly multiplied.

"It is well known to the dental profession that all the diseases common to teeth can not only be cured, but may be prevented by proper and timely treatment. After having thus enumerated the evils appertaining to a defective condition of the teeth—a condition which experience has found to exist among the army to an extraordinary extent, and having shown the importance of such diseased condition being avoided and changed to aid in establishing a proper sanitary condition among these men who risk their lives for their country's service, and have neither time, means, nor opportunity for themselves discharging their duty in this respect—we desire to urge upon the proper authorities, that a corps of dentists, or dental staff, should be attached to the United States army, similarly organized with the surgical department, who would act in connection with, and as an efficient aid to, that department, besides performing their own duties in a proper manner. Holding this to be a great sanitary measure, as well as an economical and humane movement in behalf of those affected by it, we would especially offer these suggestions to our 'Sanitary Commission,' believing that in the scope of their noble field of labor there could not be performed a more important act than the procuring of the passage of a bill through Congress, at the approaching session, which should incorporate into the army an efficient dental staff, strengthened with all the powers necessary to enable it to become most serviceable to the cause of health."—(*American Med. Times.*)

Staphyloraphy, etc., performed by MR. FERGUSSON at King's College Hospital.—"A young man then entered the theatre with a fissure extending through the soft palate and a small portion of the hard palate. Staphyloraphy was performed with complete success. There was at first a little more sensitiveness of the parts than is usually witnessed in these deformities, but it soon passed away, and the operation was readily completed. We recollect the case of a girl upon whom staphyloraphy was performed by Mr. Fergusson, on the first of December last, for cleft palate. She had previously been operated upon for hare-lip. On the occasion now referred to, however, she evinced astonishing moral and physical courage, for during the entire time she scarcely stirred; and the operation was finished in the most satisfactory manner, and a cure resulted. This was the ninetieth case of staphyloraphy performed by Mr. Fergusson, and out of that large number three only proved unsuccessful, as we heard him state in January; and that was not the fault of the operation itself.

"The fourth case was a boy aged ten years, in whom there was loss of substance of the left side of the lower lip near the angle, with adhesion of the lip to the gums, and exposure of the gums and teeth, the result of a former attack of cancrum oris. The deformity was not only unsightly, but gave rise to more or less constant slabbering. It was remedied by a sort of plastic operation, which consisted in the paring of the edges of the cicatrized part, loosening the adhesions between the chin and gums, and making an incision through the left part of the chin to relieve any traction, as well as to permit of the elevation of the left lower lip. The semicircular wound thus made was closed with hare-lip pins. If nothing occur to prevent union of the parts, the deformity will be much lessened, and the inconvenience of slabbering wholly obviated. This operation was done under the influence of chloroform."—(*Lancet.*)

"*On the Properties of Liquid Carbonic Acid.* By GEORGE GORE, Esq.—In this communication the author shows how a small quantity of liquid carbonic acid may be readily and safely prepared in glass tubes closed by stoppers of gutta-percha, and be brought in a pure state into contact with any solid substance upon which it may be desired to ascertain its chemical or solvent action, or be submitted to the action of electricity by means of wires introduced through the stoppers. By immersing about fifty substances in the liquid acid for various periods of time, he has found that it is comparatively a chemically inert substance, and not deoxidized by any ordinary deoxidizing agent except the alkali metals. Its solvent power is extremely limited. It dissolves camphor freely, iodine sparingly, and a few other bodies in small quantities. It does not dissolve oxygen salts, and it does not redden solid extract of litmus. It penetrates gutta-percha, dissolves out the dark-brown coloring matter, and leaves the gutta-percha undissolved, and much more white. It also acts in a singular and somewhat similar manner upon india-rubber. The india-rubber while in the liquid acid exhibits no change, but immediately on being taken out it swells to at least six or eight times its original dimensions, and then slowly contracts to its original volume, evidently from expansion and liberation of absorbed carbonic acid, and it is found to be perfectly white throughout its substance. These effects upon gutta-percha and india-rubber may prove useful for practical purposes.

"The liquid acid is a strong insulator of electricity; sparks (from a Ruhmkorff's coil) which would pass readily through 9–32ds of an inch of cold air would with difficulty pass through about 1–70th of an inch of the liquid acid.

"In its general properties it is somewhat analogous to bisulphide of carbon, but it possesses much less solvent power over fatty substances."—*Proceedings of the Royal Society*, in *Chemical News*. (*Dublin Med. Press*)

MISCELLANY.

The Paris correspondent of the *Lancet* says that M. C. Robin has made a report to the Acad. of Med. "on an interesting paper of M. Sucquet, pointing out certain modes of direct anastomotic communication between the smaller arteries and veins, hitherto unnoticed by anatomists. M. Sucquet has, by means of injections, (all of which have been repeated by the reporter,) shown that, independently of the capillary continuity of circulation, there exist in different regions of the body certain constant and determined connections, by means of transverse branches, between the small arteries and veins, which can be observed without the aid of the microscope. This method of vascular communication had been already noticed in the skin of the batrachians by M. Fred. Dubois, but its occurrence in the human body was unknown. M. Sucquet has also called attention to another curious anatomical fact, also new to science—namely, that in other cases a small artery, instead of breaking up into terminal branches like its neighbors, may be seen simply to make a bend upon itself and return parallel to its original course, having become a vein, and increasing in size as other veins, neighboring veins come to inosculate with it, when it is constituted the principal afferent vessel of the part. The regions in which the above vascular peculiarities have been noticed are, the skin of the fingers (more especially at their tips) and of the thenar eminence of the wrist; also in that of the elbow; on the surface of the aponeurotic expansions of the extensor tendons; on the ligaments of the hand, wrist, and elbow; in the skin of the toes and soles of the feet; in the skin of the knee, round the patella, where filiform arteries accompanied by veins, with which they communicate freely, abound; on the surface of the tibio-tarsal ligaments and of those of the knee-joint; in the skin of the lips, nose, eyelids, eyebrows, and ears; in the mucous membrane lining the nasal fossæ; and, lastly, in that of the tip of the tongue. The knowledge of the above facts must be most precious to the physiologist; and although their application and bearing can hardly at present be estimated, yet we may look upon M. Sucquet's investigations as a most important step toward a clearer insight into those mysterious laws which regulate the nutrition and repair of the tissues, and the maintenance or restoration of circulatory equilibrium."

In the clinical report of Guy's Hospital (*Lancet*) it is stated that an interesting example of epulis encroaching upon and entering the antrum has recently been under the care of MR. BRYANT. "It occurred in a young woman, aged twenty-four, who had noticed a tumor in her gum, on the left side over the bicuspid teeth, for a month. The growth being somewhat rapid, removal was suggested; and, having excised the tumor of the gum, it was found to dip upward and backward into the antrum; with the handle of the knife this was, however, readily scooped out, and the cavity left quite clear. A speedy convalescence ensued, and although seven months have passed, no return has taken place. Microscopically, the elements of the new growth were found to be those of the fibroplastic."

In a letter to the *Amer. Jour. of Sci. and Arts*, MR. JEROME NICKLES states that a prize has been decreed by the French Acad. of Science "to Bergeron for his treatise upon *stomatite ulcereuse des soldats*, (soldier's sore mouth.) This is a contagious disease which may be reproduced with some modifications by inoculation; this the author proved upon himself. According to documents collected by him it appears to be demonstrated that the appearance of ulcerated mouth was epidemic in the French army near the end of the eighteenth century. It happened that of all the great armies of Europe, those of Portugal and Belgium together with the French army, were the only ones in which this disease was observed in the form of an epidemic. The crowding of soldiers in the camp, in the barracks, and in the body guard, appears to have been the principal cause of the development and propagation of this affection. Bergeron has introduced the chlorate of potassa in the treatment of this malady. This method shortens the period of the disease, and if employed in the commencement it frequently obviates the necessity of sending the soldier to the hospital."

In an abstract of one of DR. BEALE'S discourses on histology, in the *Med. Times and Gaz.*, it is reported that in reference to bone the lecturer "said that whereas dry bone consisted of air-holding spaces, or lacunæ imbedded in a matrix, in recent bone those spaces contained living tissue. With regard to the canaliculi, or fine tubes which proceed from the surface of the lacunæ, two separate hypotheses may be maintained: one is, that they consist of processes, thrown out, or growing out from the 'cells' before ossification; or, perhaps, that they are thrown out after ossification, and then that they bore their way into the bone in the same way as the Pacchionian glands bore their way into the substance of the skull, or as the new Haversian canals are formed in old bone. But Dr. Beale disbelieves this hypothesis, on the ground that the germinal matter is never seen projecting into the canaliculi; in fact, if carmine be accepted as the test of the germinal matter, the latter is always oval, and occupies the lacunæ without projecting into the canaliculi in the least. It is true that cells with stellate projections are found in the periosteum of the jaws, but not in growing bone; in fact, Professor Beale believes that the calcareous matter is deposited in globules, and in the outermost and oldest portion of formed material surrounding each germinal centre; and that the canaliculi are channels, left between the calcareous particles, for the access of convergent currents of nutrient liquid; and that their contour is polygonal, not round, as would be the case if they were projections from the lacunæ. Concerning teeth, the lecturer stated that the dentinal tubes are really prolongations from the central germinal matter of the tooth, and are processes of germinal matter, with calcareous matter between them."

A correspondent of the *Med. Times and Gaz.* asks whether there is any truth in the report, that camphorated chalk tooth-powder renders the teeth brittle.

The *Amer. Med. Times* states that "Dr. Heber Smith, surgeon of the gunboat Monticello, who was wounded in the face at the affair on the Rappahannock, has returned home on leave of absence. The ball entered the left cheek, and, traversing the teeth of the upper jaw, escaped from the mouth, destroying several teeth, wounding the tongue, and dividing the upper lip slightly. The wounds have all healed except that in the cheek, leaving but slight cicatrices."

In his gleaning from the German journals for the *Amer. Jour. of Pharmacy*, Mr. J. M. Maisch gives the following abstract of a method of purifying silver: "Lazar Berlandt dissolves the silver in nitric acid, evaporates to dryness, redissolves in water, and precipitates by protosulphate of iron. The whitish-gray precipitate is after some hours washed with water, acidulated with muriatic acid, finally with distilled water."

The same collaborator (*Ibid.*) presents the following summary of some observations on the combinations of tin, terchloride of gold, and other metals: "Dr. Witting, sen., found that terchloride of gold in 11·520 parts water rapidly assumes a purple color in contact with pure tin filings. With $\frac{3}{8}$ lead, the tin reacted slower in 6000 water; tin with copper similar in 8000 water, but instantly in the presence of electricity, if the filings were contained in spirally wound copper and silver wire."

The *Amer. Druggists' Cir.* says that the "real *diamond-cement* is prepared in the following manner: Two drachms of powdered gum mastich are dissolved in an ounce and a half of strong alcohol, while at the same time half an ounce of Russian isinglass is dissolved in a mixture of three ounces of water and one ounce of dilute alcohol or brandy. To the solution of isinglass add one drachm of gum ammoniac, previously saturated or dissolved in half an ounce of dilute alcohol or brandy, and then mix with the solution of mastich."

BIBLIOGRAPHICAL

Decennial Index to the London Lancet, from 1851 to 1860, both years inclusive. Published by James Herald, No. 24 Ann Street, New York.

This is an extremely valuable exponent of the contents for the last decennium, of that standard and popular English medical periodical, the *Lancet*. Besides its intrinsic value, the low price of fifty cents asked for it, should induce every one interested in medicine to secure a copy as a useful addition to the library.

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